INFRASTRUCTURE DEVELOPMENT FOCUSING ON EFFECTIVE STRUCTURING PUBLIC-PRIVATE PARTNERSHIP

By

HYUNJI PARK

THESIS

Submitted to

KDI School of Public Policy and Management

In partial fulfillment of the requirements

For the degree of

MASTER OF PUBLIC POLICY

2014

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ABSTRACT

INFRASTRUCTURE DEVELOPMENT FOCUSING ON EFFECTIVE STRUCTURING PUBLIC PRIVATE PARTENRSHIPS

By

HyunJi Park

Infrastructure development is the integral part of social assets to generate substantial economic benefits to individual quality of life, enterprise' quality of productivity, and broadly economic development based on transportation system, energy plant, logistic, electric and internet grid. It also contributes to job creation, ameliorated services and our lives. Infrastructure development requires long-term perspective and analysis of comprehensive understanding from design, construction, finance, maintenance, to operation of infrastructure investment. Public-Private Partnerships in this regard enhance bilateral collaboration between public sector and private sectors. This research will review Public-Private Partnerships on infrastructure development on theoretical and empirical approach in the U.S. and Korean project basis. The purpose of this study is to explore the effective structuring of Public-Private Partnerships for infrastructure development enabling the optimal mixtures of concessionaries.

Keywords: Infrastructure development, Public Private Partnerships, PPPs

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*

A Higher Purpose *

*

Now I open a new chapter of my life.

*

I understood why my entire of life journey was such a challenge

and

adventurous.

* *

Especially thanks to my family supporting me and fulfilling love in my life.

This is such a meaningful thesis as I am the last student of Professor Oh.

Love, Trust, Respect.

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KEY TO ABBREVIATIONS

1	ADB	Asian Development Bank, World Bank
2	BBO	Buy-Build-Operate
3	BOT	Build-Operate-Transfer
4	BOO	Build-Own-Operate
5	DB	Design, Build
6	DBF	Design, Build, and Finance
7	DBFOM	Design, Build, Finance, Operation, and Maintenance
8	DFID	UK's Department for International Development
9	DBO	Design, Build, Operate
10	FDOT	Federal Department of Transportation, U.S.
11	GCDF	Global Clearinghouse for Development Finance
12	LFI	Local Finance Initiative
13	MRG	Minimum Revenue Guarantee
14	PPPs	Public-Private Partnerships
15	O&M	Operations and Maintenance
16	OMM	Operations, Maintenance & Management
17	REPs	Requests for Proposal
18	RFQs	Competitive Request for Qualifications
19	SPC	Specific Purpose Company
20	TIFIA	Transportation Infrastructure Finance and Innovation Act
21	UNCDF	United Nations Capital Development Fund

CHAPTER I

INSTRUCTION

I. Introduction

"Infrastructure is the basic physical and organizational structure required for the operation of a society or enterprise (Oxford,2009)[1]" or "The service and facilities necessary for an economy to function (Sullivan,2003).[2]" Infrastructure refers to facilities supporting a society, such as roads, bridges, water supply, internet grids, electrical grids, telecommunications, sewers etc. Also, "infrastructure can be defined as the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions (Fulmer,Jeffrey,2009)."[3]

Infrastructure development has been at the core of economic development from developing countries to developed countries. For developing countries, many international finance institutions (e.g. Asian Development Bank, World Bank, etc.) spend as much as half of their total resources on infrastructure development. DFID(UK's Department for International Development) spent nearly £1 billion on infrastructure in 2009-2010.[4] Also, developed countries' infrastructure such as the United States has made it to the top of the political issue despite many distractions in the global economy.

The recent survey shows that 77 percent of boards of directors believe that "The current level of public infrastructure is inadequate to support their company's long-term growth in the United States. These executives believe that infrastructure will become more important in

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[1] Infrastructure, Online Compact Oxford English Dictionary, http://www.askoxford.com/concise_oed/infrastructure (accessed January 17 2009)

[2] Sullivan, arthur; Steven M. Sheffrin (2003). *Economics: Principles in action* p. 474. ISBN 0-13-063085-3.

[3] Fulmer, Jeffrey (2009). "What in the world is infrastructure?". *PEI Infrastructure Investor* (July/August): 30–32

[4] DFID's Role in Building Infrastructure in Developing Countries, September 2011

determining where they are positioning their operations within next 5 years (KPMG, 2009)."[5] The public sector also has awakened to the consequences of neglecting roads, public transit, bridge, internet grid, electricity grid and social infrastructure such as schools, hospitals. According to a recent poll, 94 percent of Americans are concerned about the condition of the nation's infrastructure. Remarkably, 81 percent respondents will pay 1 %t more willingly on their federal income tax to improve America's infrastructure.[6]

Recently Korea is also in transition period to be deteriorated into aged facilities and infrastructures. Concentrated population in the cities according to the rapid economic growth since 1960s, results in traffic jam, and unbalanced development in living environment. For instance, "Over the past three years, 53 sinkholes have been discovered on the roadway in across the nation including Seoul, Ulsan, Daejeon, Changwon and Suwon in Korea (MaeKyung news, 2014)." [7] Infrastructure such as roads, public transit, bridges, internet grid and electricity grid is related with citizen's safety, quality of life, and broadly economic improvement. The infrastructure investment is constant issues on a national level requiring financial resources.

In line with this, this research paper aims to explore the methods for infrastructure development through reviewing the case studies and Public Private Partnership (PPPs) models and interviewing experts.

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[5] Top Executives Say Current Infrastructure Investment Won't Support Business Growth, Says KPMG Study," PRNewswire, January 14, 2009 <http://news.prnewswire.com/DisplayReleaseContent.aspx?ACCT=ind_focus.story&STORY=/www/story/01-14-2009/0004954443&EDATE>.

[6] Building America's Future, "Building America's Future Releases New Poll: Majority of Americans Ready to Pay for Better Infrastructure but Demand Accountability," press release issued on January 8, 2009 <http://investininfrastructure.org/newsroom/pr_010809.pdf>.

[7] http://news.mk.co.kr/newsRead.php?year=2014&no=1124484

CHAPTER II

Theoretical Approach of Public-Private Partnerships

II. Theoretical Approach of Public-Private Partnerships

2-1. Public-Private Partnership

"*A public–private partnership (PPP) is a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies." "These schemes are sometimes referred to as PPP, P3 or P3s.*[8] *PPP involves a contract between a public sector authority and a private party, in which the private party provides a public service or project and assumes substantial financial, technical and operational risk in the project* (Barlow, J 2013)." [9]

Typically, the process of financing on infrastructure is very similar with project financing on real estate investment. Project finance entails raising capital via loans, bonds or financial mechanisms. A private sector concessionaire setup the "special purpose company" (SPC) for the infrastructure project to proceed design, build, finance, maintenance and operation.[10] Typically the government has invested in the project in this cases, allotted an equity-share in the SPC.[11] The consortium is consists of a bank lenders, equity investors, building contractor, maintenance or operation companies. The government contract with private partner, subcontractors to build, to maintain, or to operate the infrastructure facilities.

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[8] http://en.wikipedia.org/wiki/Public%E2%80%93private_partnership

[9] Barlow, J., Roehrich, J.K. and Wright, S. (2013). Europe Sees Mixed Results From Public-Private Partnerships For Building And Managing Health Care Facilities And Services. Health Affairs. 32(1):146-154 http://www.ncbi.nlm.nih.gov/pubmed/23297282

[10] Zheng, J. Roehrich, J.K. and Lewis, M.A. (2008). The dynamics of contractual and relational governance: Evidence from long-term public-private procurement arrangements. Journal of Purchasing and Supply Management. 14(1): 43-54 http://www.scopus.com/record/display.url?eid=2-s2.0-41049112855&origin=inward&txGid=yXIvJQ7AsPq0YyDQfJmJLCa%3a23.Jump up ^ Moszoro M., Gasiorowski P. (2008), 'Optimal Capital Structure of Public-Private

[11] Retrieved Moszoro M., Gasiorowski P. (2008), 'Optimal Capital Structure of Public-Private Partnerships', IMF Working Paper 1/2008. Papers.ssrn.com (2008-01-25)

In the infrastructure project, complicated contracts and arrangements that guarantee the future cash-flows can make PPPs projects prime candidates for project financing. A typical PPPs example is very similar with real estate development model. For example, to build hospital under the project financing and building developer can be a private sector and the hospital lease the authority to the private partner. "Then the private developer acts like landlord, providing non-medical services and housekeeping while the hospital provides medical services by itself (Barlow J.2013)[12]."

Even though private sector plays integral role in collaboration tool, PPPs model does not mean selling public assets or public facilities to private sector. PPPs can create more effective benefits for the public project taking risks and responsibilities including design, building, equity investment(finance), operation, and maintenance (varies depends on the contracts condition). PPPs enables to accelerate the project implement by private sector's resource, technical know-how, cut costs and controlling construction-delay.

BENEFITS

Here are the primary benefits of PPPs: [1] PPPs projects are more likely to keep on-time and on-budget than traditional procurement for infrastructure development. (As late-delivery causes losses for private sector directly such as interest-costs, and labor costs.) Pre-determined standard construction and maintenance services can deliver more precise social benefits. [2] PPPs enable open transaction sooner. The private sector provides up-front capital to complete project that is not subject to annual budget constraints of public debt caps. [3] Private partner fully or partially take some risks such as financial risks and construction

[12] Barlow, J., Roehrich, J.K. and Wright, S. (2013). Europe Sees Mixed Results From Public-Private Partnerships For Building And Managing Health Care Facilities And Services. Health Affairs. 32(1):146-154 http://www.ncbi.nlm.nih.gov/pubmed/23297282

delay-related risks. In this regard, PPPs enable to transfer risks in a cost effectively. [4] In the case of that the private sector is responsible for operating and maintaining the asset, "The private sector has a strong incentive to minimize life cycle costs which means building to higher standard initially and timely maintenance through the life of a project. Public agencies may be unable to do this simply because of fiscal challenges (FHWA)."[13]

PPPs' RISKs & LIMITATION

There are also risks to PPPs projects. All of projects are not guaranteed to succeed no matter what PPPs enable to transfer risks to the private partners. PPPs can release the risks with controlling procurement, but there are always the potential risks that come with financing, constructing, and maintaining the infrastructure projects. Also, infrastructure projects are usually expected higher transaction cost due to financing costs, procurement expenses, and various fees. Here are primary possible risks that the private sectors were burdened:

[1] Delivering PPPs project accompanied by higher transaction costs. Infrastructure project and the procurement of long-term contracts are required with extensive due diligence and technical expertise. [2] Difficulty forecasting uncertain-things: Infrastructure development needs long-term view estimating uncertain-demand, financing, operations and maintenance. It is hard to estimate possible scenario with appropriate value of an agreement. [3] Higher finance costs: PPPs projects are typically financed with debt issued by institutional bank or public agencies. Private partner requires a competitive rate of return on investment.

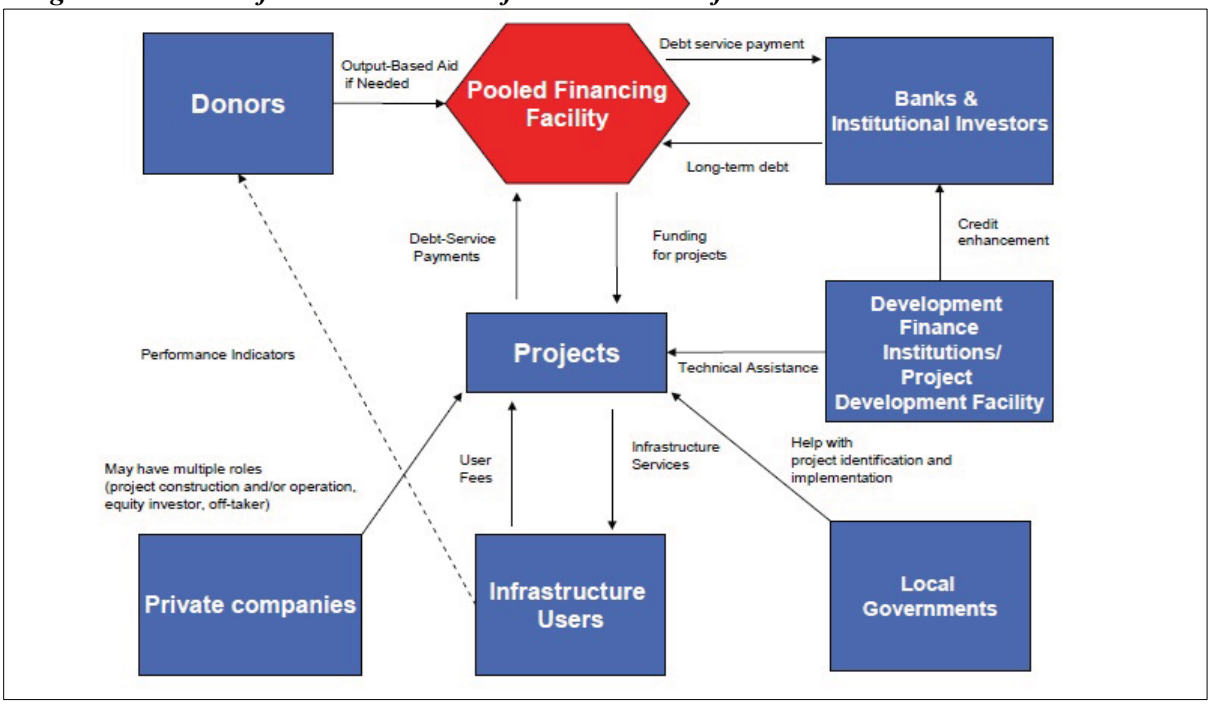
[13] http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum

2-2 Possible Public Private Partnerships Models

POSSIBLE PPPs MODEL 1.

In this regards, PPPs projects should be limited on typical projects expecting very stable revenue streams. In a developing country, most of small-scale infrastructure projects facilitate raising capitals via donor resources.

< Figure 1> Possible finance mechanism for small-scale infrastructure



Source: "Local Finance Initiative (LFI)"—A partnership between the UN Capital Development Fund and Global Clearinghouse for Development Finance.

"In 2009 a pooled financing approach designed for financing small scale of rural infrastructure on a multiple-sector basis was developed by the UNCDF 'Local Finance Initiative (LFI)' as partnership with the GCDF(Global Clearinghouse for Development Finance)."[14] This approach includes technical financial assistance, risk management and

[14] The use of pooled facilities and related financing mechanisms has been developed in a wide range of countries. Examples include the United States (state bond banks, water and waste water treatment revolving loan funds, equipment lending pools); Kenya (K-Rep Bank pooled water facility); Czech Republic (MUFIS);

incentives that can mobilize private sector's finance tools, institutional investors including banks, financial companies, pension funds, over the longer term. All the elements of this proposal have been tested in infrastructure financing programs carried out in many countries. (UN,2012)[15]

POSSIBLE PPPs MODEL 2.

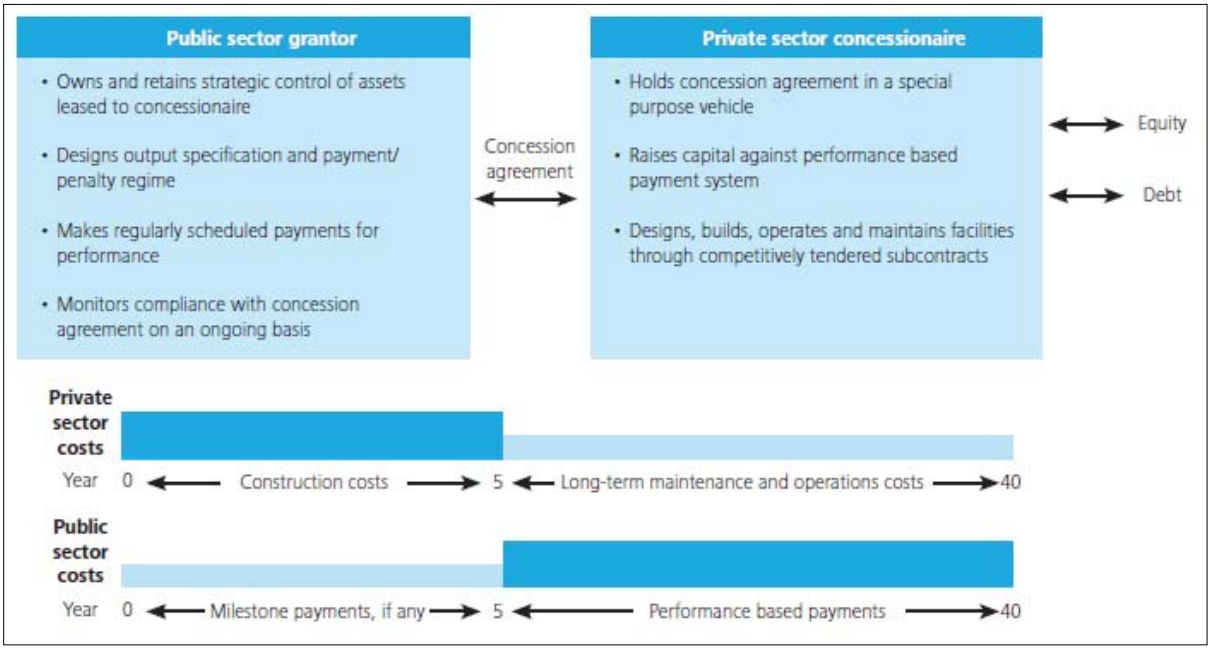
The Florida Department of Transportation input a $1.8 billion 35 year concession with a private consortium in 2009, headed by the Spanish firm ACS Infrastructure Development, to build and operate high-occupancy toll lanes near Fort Lauderdale. The financing includes $750 million in commercial bank debt; more than $200 million in equity; a $603 million loan from the federal TIFIA(Transportation Infrastructure Finance and Innovation Act) program. In this PPP, the FDOT will set rates of toll, retain all revenues sources from infrastructure facility and form "Availability Payments" to the private concessionaire annually out of all of its revenues including tax revenues, state appropriations and tolls.[16] This project is the first U.S. toll road structured by "Performance-Based Availability Payments".In the "Availability Payment Model", revenue sources derived from a project retained by the public agency. The public agency pays periodical fees to the private partner under the PPPs agreement. It makes possible the private partners revenues not tolls but the public agencies' fixed availability payment. Also, private partner can maximize funding; the ratio of debt to equity in a risky demand project 80/20; in Availability Payment Model the ratio can be 90/10.

South Africa (MIIU); India (Tamil Nadu pooled water facility); and other applications in the Philippines, Colombia, and Morocco. For the UNCDF approach initially set forth in 2009 for diversified pools of rural infrastructure projects, see "Financing Local Infrastructure: Part One Report—The Tanzania Environmental Scan," page 43, http://uncdf.org/gfl d/docs/infradev.pdf

[15] http://www.un.org/esa/desa/papers/2012/wp114_2012.pdf (p. 5-6)

[16]https://www.deloitte.com/assets/DcomKazakhstan/Local%20Assets/Documents/Industry/dtt_ps_partneringforvalue_031109[1].pdf

< Figure 2> Availability Payments Model



Source: Deloitte

The public partner commits milestone payments to the private partner for the facility's maintenance and operation. Public sector as a grantor owns and retains strategic control of assets, also monitors PPPs' agreement on an ongoing-basis while the private partners proceed the concession agreement project such as design, build, and maintenance, and operation. In the toll-project, the public sector retains the revenue resource, tolls. "To determine the amount of availability payment, private sector bidders submit bids based on the maximum annual payment they would require (FHWA,2012)[17]."

But, it should be noted that this model transfer the demand risks are burden to the public partner than the private partner. If revenues are less than expected, the public sector make up for the deficit. If toll revenues are excess from the required availability payment, the public agency may choose to reinvest surplus income to the transportation system or to low tolls on the facility.

<Table1> Characteristics of Availability Payment vs Toll-based Revenue Risk

[17] http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf, p65

Availability Payments	Toll-based Revenue Risk P3
• Payments are made for a fixed amount on a periodic basis • Potential concessionaires bid on required payment amount • Bid amounts depend on the concessionaire's expected project costs, likelihood of achieving performance standards, and desired return on investment • Payments begin when facility is open to traffic (although progress payments can also be included) • For toll-based projects, public sector sets toll rates and receives toll revenues • Public sector imposes financial penalties for failure to meet performance standards, such as lane availability, exist • Private investors may perceive less risk and be more willing to invest	• Revenues are generated from tolls • Potential concessionaires may bid on amount paid to public agency for revenue stream or required payment amount • Bid amount depends on estimates of likely costs and revenues and desired return on investment • Payments depend on toll rate schedule (usually set in the agreement) and facility demand • Concessionaire captures residual revenues, usually subject to maximums • Legal and financial recourse is established for failure to meet performance standards

Source: Federation Highway Administration, U.S.

2-3 Legislation Issues for structuring Public-Private Partnership

At a March 2010, meeting of the National Conference for State Legislatures in Washington, D.C., participants agreed that legislative language should call for tools to consider the most effective procurement framework before a project is procured using any one particular approach. Without such legislation, counties, municipalities, regional transportation authorities, and even state agencies do not have the authority to move forward with the most effective method of procurement. This is especially true for public-private partnerships because they typically require transacting a structured finance deal.[18]

Legislation is necessary to enable PPPs as they typically require transaction structured finance deal. To implement Public-Private Partnership project successfully the government need to come up with legislation-grid between public sector and private sector. Public-Private Partnerships interact with political, real estate sophistication, finance, legislation and public

[18] http://www.pwc.com/en_US/us/capital-projects infrastructure/publications/assets/Public_Private_Partnerships.pdf (p.4-5)

policy. "In the United States, Public Private Partnerships in Transportation - a Toolkit for legislators developed by the National Conference of State Legislators - includes links to PPPs enabling legislation in different states of the US. (National Conference of State Legislators)[19]" PPPs enabling legislation varies among States, but the key features by states are the same as follows:

< Table 2> Key Features on PPP-enabling legislation by state

	Solicited and unsolicited proposals allowed	Local, state, or federal funds can be combined with private-sector funds	Various kinds of procurements allowed for project delivery[1]	Long-term leases/franchises granted by the public sector for construction, operation, and maintenance of toll facilities	Public sector has authority to issue toll revenue bonds or notes	Public sector agency can hire its own technical and legal consultants	Public sector outsources long-term operations and maintenance and other asset management duties to the private sector
AL				•			•
AK		•		•	•	•	•
AZ	•			•			•
CA	•		•	•			
CO	•	•	•	•	•	•	•
DE	•	•	•	•			•
FL	•	•	•	•	•	•	•
GA	•	•	•	•		•	•
IN		•	•	•	•	•	•
LA	•	•	•	•	•		•
MD	•		•	•		•	•
MN	•			•	•		•
MS	•	•	•	•	•	•	
MO	•		•	•	•		•
NV	•	•		•			•
NC	•	•	•	•	•	•	•
OR	•	•	•	•	•	•	•
SC					•		•
TN		•	•		•		•
TX	•	•	•	•	•	•	•
UT	•	•	•	•	•	•	•
VA	•	•	•	•		•	•
WA	•	•	•	•	•	•	•

[1]Examples include calls for projects, competitive requests for proposal, qualifications review followed by an evaluation of proposer concepts, use of design-build, procurements based on financial terms such as return on equity rather than on price, long-term asset leases for some period of up to 60 years or longer from the time operations commence.

Source: PricewaterhouseCoopers analysis based on Federal Highway Administration and US Department of Transportation data

PROCURMENT & STATUTORY PROVISIONS

[19] National Conference of State Legislators. Public-Private Partnerships for Transportation: A Toolkit for Legislators. www.ncsl.org/default.aspx?TabId=20321

While traditional procurements often require uniform bid packages to candidate bidders, PPPs contract may be included in enabling legislation which permits nonconventional procurement process with 4 provision types:

[1] Permissible Types of Procurement Methods: PPP proposals including:

- **Unsolicited proposals:** Some States allow unsolicited proposals for potential PPPs projects which allow private sectors to propose solutions related transportation issues. Unsolicited proposals can contribute to delivery solution that the public sector might not be considered while the private sector may tends to propose high financial return project rather than the government regional plan or public purpose.[20]
- **Competitive Request for Qualifications (RFQs) and Requests for Proposal(REPs),**
- **Negotiations with the winning bidders, and**
- **Best and final offers.**

[2] Allowable Types of Payment and Fees: Some States require bidders to pay fees the costs of proposal review.[21]

- **Application Fees:** If unsolicited proposals are allowed, application fees can be useful tool to help defray the costs incurred by public sponsors in reviewing the unsolicited proposals.
- **Performance Security:** "State law requires a contract performance security, which is a financial guarantee made by a contractor to a States."(FHWA)
- **Stipends: "**This is kind of government funding for bidders involving in PPPs projects. PPPs projects require design, finance, construction, and operation. Some States allow stipends for qualified bidders to increase competition by encouraging more bidders."(FHWA) Also, Stipends can used to compensate losing bidders.

[3] Proposal Evaluation Criteria: Some states like Texas describe legislation criteria when proposals are evaluated such as PPPs program policy and guideline. PPPs statutes permit the criteria based on the best value rather than low bid. Value considerations include: the

[20] Revised from Federal Highway Administration, U.S.Department

[21] Federal Highway Administration, U.S.Department

bidder's qualification, experience, and key staff; the quality of the proposed technical solution; the operations and maintenance plan; and the project's lifecycle costs.[22]

[4] Confidentiality and Transparency: "While public disclosure of proposal details can help improve the transparency and public 235 legitimacy of the bidding process, full transparency may deter private sector bids. Legislation may 236 establish a process whereby private bidders identify confidential and proprietary information that 237 should be excluded from disclosure."(FHWA)

AGREEMENT PROVISIONs

Enabling legislation prescribe specific parameter for contract provision in PPPs agreement.

< Table3 > Potential Statutory Restrictions on Agreement Provisions

Provision Type	Description
Risk Allocation	Require defined process for accessing and allocating risk.
Payment/Revenue	-Limit toll rate increases -Designate a public agency to determine/approve rate increases -Require revenue sharing provisions
Term Length	Limit contract term length to specified number of years.
Non-compete clauses	Forbid broad non-compete clauses
Review of final agreement	-Require legislative review/approval of final PPPs agreements -Designate committee or commission responsible for final approval

Source: Federation Highway Administration, U.S.

Furthermore, "There are tradeoffs associated with some legal decision, particularly where public and private concerns can conflict, such as transparency and competition to require in the procurement process and the level of public and legislative input to allow in the decision-making process (Federation Highway Association, U.S)[23]."

2-4 5 Components of an Infrastructure Project & Type of Partnerships

[22] Revised from Federal Highway Administration, U.S.Department, http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf, p19

[23] http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf cit.p12

According to the public sector's needs of infrastructure scope, the private sectors participate project via DBF(Design, Build, Finance) or DBFOM(Design, Build, Finance, Operation, Maintenance). Most infrastructure development projects are composed of 5 components: design, construction, finance, operation, and maintenance. The details are as follows:

<Table4> 5 components of an infrastructure project

Components	Contents
Design.	Under virtually any partnership structure the responsibility for design will be shared. For instance, even in partnership structures with high degrees of private responsibility, the public sector's articulation of performance specifications will limit the range of design options. In many projects, the need to ensure compliance with broader planning and environmental guidelines results in a significant degree of public sector design.
Build/Construction	This component includes the construction of the physical asset(s) over a prescribed period of time, generally at a prescribed cost. Deciding which party assumes the impact of construction cost overruns and time delays must be considered.
Operation	Operating the asset may include various activities from general management of service provision and revenue collection to performing soft (or non-core) services associated with an asset, such as laundry services within a hospital. Operation typically begins at the end of construction, upon agreement that the construction has been satisfactory. In PPPs, the private partner's compensation is dependent on the achievement of performance standards.
Ongoing Maintenance	Generally, there are two principal types of maintenance to be considered in any infrastructure project: ongoing regular maintenance (or operating maintenance), and major refurbishment, often called life-cycle or capital maintenance.
Finance	This component generally includes financing for the capital costs of construction, as well as working capital requirements.[24]

Source: Deloitte

TYPES of PARTNERSHIPS

The types of partnerships are various depending on the components; design, build,

[24] Retained Deloitte Research-Partnering for value (p.4)

finance, operation, and maintenance. The below definitions of partnership types were from *"Public-Private Partnerships: Terms Related to Building and Facility Partnerships (Government Accounting Office, April 1999)."*

<Table5> Types of Partnerships[25][26]

O&M (Operations and Maintenance) : A public partner (federal, state, or local government agency or authority) contracts with a private partner to provide and/or maintain a specific service. Under the private operation and maintenance option, the public partner retains ownership and overall management of the public facility or system.
OMM (Operations, Maintenance & Management): A public partner (federal, state, or local government agency or authority) contracts with a private partner to operate, maintain, and manage a facility or system proving a service. Under this contract option, the public partner retains ownership of the public facility or system, but the private party may invest its own capital in the facility or system. Any private investment is carefully calculated in relation to its contributions to operational efficiencies and savings over the term of the contract. Generally, the longer the contract term, the greater the opportunity for increased private investment because there is more time available in which to recoup any investment and earn a reasonable return. Many local governments use this contractual partnership to provide wastewater treatment services
DB (Design-Build): A DB is when the private partner provides both design and construction of a project to the public agency. This type of partnership can reduce time, save money, provide stronger guarantees and allocate additional project risk to the private sector. It also reduces conflict by having a single entity responsible to the public owner for the design and construction. The public sector partner owns the assets and has the responsibility for the operation and maintenance
DBM (Design-Build-Maintain): A DBM is similar to a DB except the maintenance of the facility for some period of time becomes the responsibility of the private sector partner. The benefits are similar to the DB with maintenance risk being allocated to the private sector partner and the guarantee expanded to include maintenance. The public sector partner owns and operates the assets.
DBO (Design-Build-Operate): The DBO method of contracting is contrary to the separated and sequential approach ordinarily used in the United States by both the public and private sectors. This method involves one contract for design with an architect or engineer, followed by a different contract with a builder for project construction, followed by the owner's taking over the project and operating it. A simple design-build approach creates a single point of responsibility for design and construction and can speed project completion by facilitating the overlap of the design and construction phases of the project. On a public project, the operations phase is normally handled by the public sector under a separate operations and maintenance agreement. Combining all three passes into a DBO approach maintains the continuity of private sector involvement and can facilitate private-sector financing of public projects supported by user fees generated during the operations phase.
DBFOM (Design-Build-Finance-Operate-Maintain): With the Design-Build-Finance-Operate-

[25] The National Council for Public Private Partnership, http://www.ncppp.org/ppp-basics/types-of-partnerships/

[26] <*Appendix 3*> Types of Partnerships Including Lease Component

Maintain (DBFOM) approach, the responsibilities for designing, building, financing, operating and maintaining are bundled together and transferred to private sector partners. There is a great deal of variety in DBFOM arrangements in the United States, and especially the degree to which financial responsibilities are actually transferred to the private sector. One commonality that cuts across all DBFOM projects is that they are either partly or wholly financed by debt leveraging revenue streams dedicated to the project. Direct user fees (tolls) are the most common revenue source. However, others ranging from lease payments to shadow tolls and vehicle registration fees. Future revenues are leveraged to issue bonds or other debt that provide funds for capital and project development costs. They are also often supplemented by public sector grants in the form of money or contributions in kind, such as right-of-way. In certain cases, private partners may be required to make equity investments as well. Value for money can be attained through life-cycle costing.
BOT (Build-Operate-Transfer): The private partner builds a facility to the specifications agreed to by the public agency, operates the facility for a specified time period under a contract or franchise agreement with the agency, and then transfers the facility to the agency at the end of the specified period of time. In most cases, the private partner will also provide some, or all, of the financing for the facility, so the length of the contract or franchise must be sufficient to enable the private partner to realize a reasonable return on its investment through user charges. At the end of the franchise period, the public partner can assume operating responsibility for the facility, contract the operations to the original franchise holder, or award a new contract or franchise to a new private partner. The BTO model is similar to the BOT model except that the transfer to the public owner takes place at the time that construction is completed, rather than at the end of the franchise period.
BOT (Build-Operate-Transfer): The private partner builds a facility to the specifications agreed to by the public agency, operates the facility for a specified time period under a contract or franchise agreement with the agency, and then transfers the facility to the agency at the end of the specified period of time. In most cases, the private partner will also provide some, or all, of the financing for the facility, so the length of the contract or franchise must be sufficient to enable the private partner to realize a reasonable return on its investment through user charges. At the end of the franchise period, the public partner can assume operating responsibility for the facility, contract the operations to the original franchise holder, or award a new contract or franchise to a new private partner. The BTO model is similar to the BOT model except that the transfer to the public owner takes place at the time that construction is completed, rather than at the end of the franchise period.
BOO (Build-Own-Operate): The contractor constructs and operates a facility without transferring ownership to the public sector. Legal title to the facility remains in the private sector, and there is no obligation for the public sector to purchase the facility or take title. A BOO transaction may qualify for tax-exempt status as a service contract if all Internal Revenue Code requirements are satisfied.
BBO (Buy-Build-Operate): A BBO is a form of asset sale that includes a rehabilitation or expansion of an existing facility. The government sells the asset to the private sector entity, which then makes the improvements necessary to operate the facility in a profitable manner

Source: The National Council for Public Private Partnership

2-5 Typical Revenue Sources

Project revenues of PPPs are various. Revenue sources are the key criteria to estimate the future value. Future revenues are closely related with financial-debt issued by commercial

banks or institutional investors, if concessions can't deliver 100% equity investment on the project. Typical revenue sources are State and local gas and sales taxes, as well as Federal aid funds. "PPPs may also be structured to take advantage of non-traditional revenue sources such as local option taxes, parking and other fees, tax increment financing, and tax assessment districts."(FHWA)[27] But, at the point of revenue stability, traditional revenue sources such as State and local gas and sales taxes are considered more likely stable than local option taxes. So, this perception can be derived typical type of revenue sources are easier to get leverage than the new-types of revenue sources.

<Table6> Typical PPPs Revenue Sources (exclude revenue source from equity and debt)

Revenue Source	Advantages	Disadvantages
Tolls	Direct user fee, may create stronger performance incentives for a facility operator. Revenue risk can be transferred to the private sector. Tolling structure may include market pricing mechanisms that create economic benefits.	Traffic and revenue forecasts can fall short of actual revenues. Use of additional toll revenues may be constrained within pre-defined limits of the corridor to address geographic equity concerns. Few facilities can be fully financed on toll revenues alone; recent experience shows that most projects will require a combination of revenue sources to work. Costs of collection may be higher than other revenue sources.
State fuel taxes	Indirect user fee. Revenues are not directly associated with the use of a specific project, but related to general use of highway network, therefore they may be relatively stable. Low cost of collection.	Yield declining over time since they typically do not increase in line with inflation and improved fuel efficiency and introduction/growth of alternative fuels lead to lower fuel usage. Significant demand from competing priorities/interests.
Federal-aid highway funds and discretionary funds	Derived from federal fuel taxes—a relatively stable revenue source and an indirect user fee.	Yield declining over time, see above. Federal funds are generally linked to regulations and contracting requirements (e.g., NEPA, Davis-Bacon, etc.) that may be more demanding than the requirements of other revenue sources. Once obligated or awarded, Federal funds, grants and earmarks must be used within a specific timeframe (generally

[27] http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf, cit, p53

		three years).
Sales taxes	Relatively stable revenue source, though subject to influence of economic growth and recession.	May create market distortions because it is not aligned with the "user pays" concept. Some of the local option taxes or those dedicated for specific uses may have a "sunset" date that may or may not be aligned with the length of the P3 agreement.
Value capture *Impact fees* *Special assessments* *Tax increments* *Development contributions* *Joint development /development rights*	May capture economic value created through infrastructure improvements that is not captured by other sources. Value capture options can be chosen based on regional/local conditions and project needs.	Subject to the volatility of the real estate market. Rated low by bond rating agencies. Yield may be low for major projects; likelihood of requiring other revenue sources is higher. There can be concerns about the public sector being a "landlord." Policy issues related to eminent domain takings (if any required for the project) being turned over to the private sector for profit.
Ancillary revenues *Rest stops* *Utility/fiber optics on highway right-of-way* *Advertising* *Air rights*	Encourage private sector to optimize potential revenue options, reducing the need for limited public resources	Yield is relatively low; cannot be considered as standalone funding sources, but as part of the "revenue portfolio."

Source: U.S. Department of Transportation, Federation Highway Administration

Additionally today's value is not as same as tomorrow's. The value of revenue sources is changeable due to the industrial trend, environmental changes, and new technology inventions. For example, the main revenue source of highway investment project is fuel-taxes, but if alternative fuels are used or electricity cars are popular, the revenue will decline.

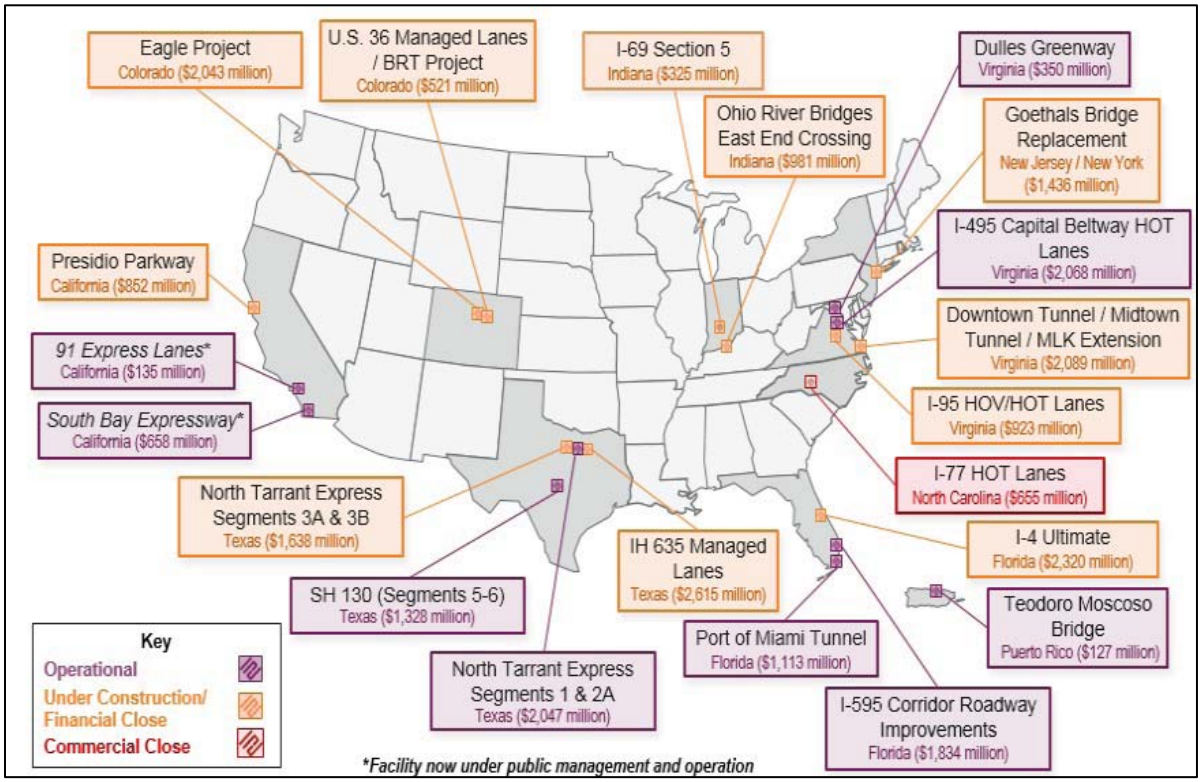
CHAPTER III

Case Study 1. Florida 1-595 Corridor Roadway Improvement Project

III. Case Study 1. Florida 1-595 Corridor Roadway Improvement Project

For infrastructure development, Public-Private Partnership Concessions became a vital role in delivery projects. In the United States, Public-Private Partnership concessions have been implemented briskly to develop tunnels, bridges, roadways, lanes, and expressways since 2005.

< Figure 3 > PPP Concessions in the US

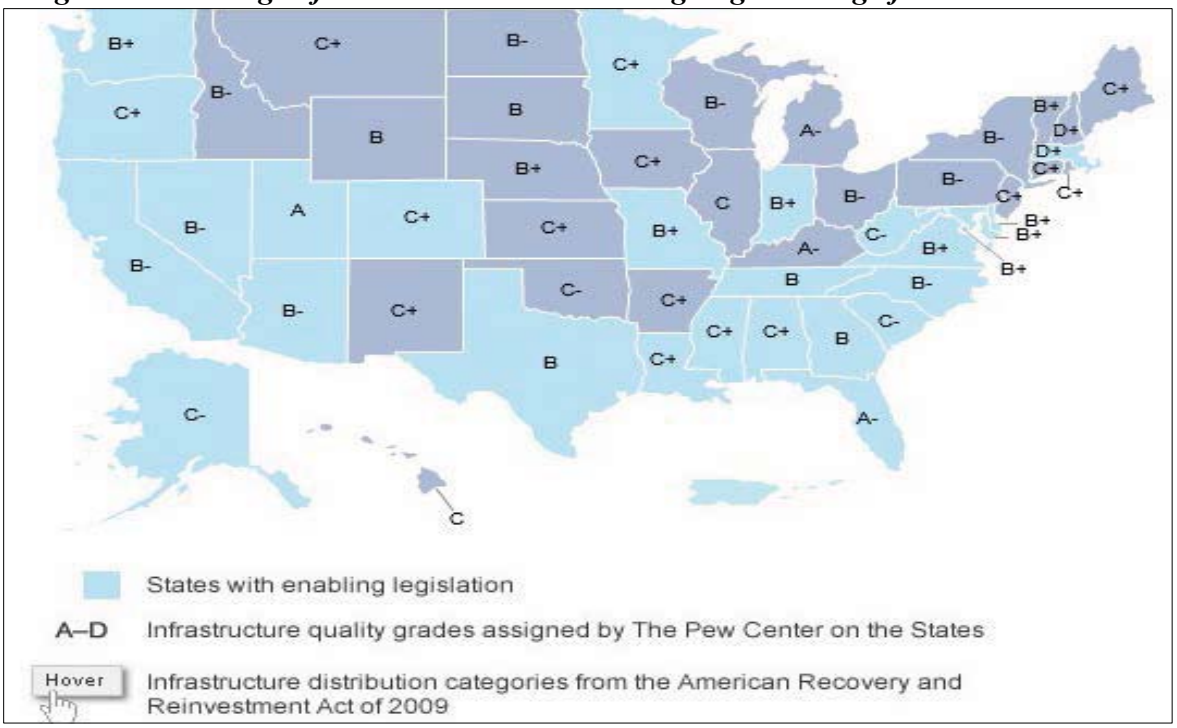


Source: Federal Highway Administration

WHY SELECTED THIS CASE

Considering all of the criteria from <*Table2*> <*Figure 3*>,<*Figure 4*>, Florida States in the United States is the best example to study Public-Private Partnership for infrastructure development at the points of familiar-PPPs environment in legislation, on-operation, needs fulfillment, and quality grade assigned by Pew Center on the states.

< Figure 4> Meeting Infrastructure needs in an ongoing challenge for states



Source: PricewaterhouseCoopers analysis based on Federal Highway Administration and US Department of Transportation data

3-1 Description of Florida I-595 Corridor Roadway Improvements Project

Federal Highway Administration, U.S. Department of Transportation shows the description of Florida I-595 roadway Improvement Project as follows:, The I-595 corridor was opened to traffic in 1989 to coordinate high traffic-volumes between the western part of the Southeast Florida with the established north-south freeway and principal roadways to the east, including I-75, Florida's Turnpike, SR 7, I-95 and US 1. However, travel demand for using the corridor has increased to reach the highway in the short term. The I-595 Corridor Roadway Improvements project included [1] Roadway improvement on the mainline of I-595 [2] Roadway improvement on Ramps from the I-75/Saw grass expressway interchange to the I-595/I-95 interchange [3] Widening mainline of I-595. The Federal Highway Administration, U.S. Department of Transportation describes this project as follows: The project passes through, or lies adjacent to, six jurisdictions: City of Fort Lauderdale City of Sunrise;; City of Plantation; Town of Dania; Town of Davie and unincorporated areas of Broward County. A

major component of the project is the construction of three at-grade reversible express toll lanes to be known as 595 Express, serving express traffic to/from the I-75/Sawgrass Expressway from/to east of SR 7, with a direct connection to the median of Florida's Turnpike. These lanes will be operated as managed lanes with variable tolls to optimize traffic flow, and will reverse directions in peak travel times (eastbound in the AM and westbound in the PM). The project is being proceed as a concessionaire between FDOT and a private partner from design, build, finance, operation, to maintenance in the roadway for 35 years period. FDOT will provide management oversight of the contract; will install, test, operate and maintain all tolling equipment for the express lanes; and will set the toll rates and maintain the tolls.[28]

< Figure 5> Project Location

Source: Federal Highway Administration, U.S. Department of Transportation

[28] Federal Highway Administration, U.S. Department of Transportation
http://www.fhwa.dot.gov/ipd/project_profiles/fl_i595.aspx

This project delivered all of the process, DBFOM((Design, Build, Finance, Operate, and Maintain)method by private sector, which construction began in June 2009; substantial completion was achieved on March 26, 2014.

< Table7> Description of I-595 Florida Corridor Roadway Improvement

Private Partner	I-595 Express, LLC (ACS Infrastructure Development and TIAA CREF (50/50 split of the equity portion on loan)) as Concessionaire Subcontractors/Subconsultants: Dragados USA Inc. - Design-build contractor AECOM Technical Services, Inc. - Lead engineering firm HNTB Corp - Construction engineering and inspection Roy Jorgensen Associates, Inc. - Operations & Maintenance
Project Advisors / Consultants	To Sponsor: Dewey & LeBoeuf LLP - legal Macquarie Capital (USA) Inc. - financial Scott Wilson, Plc. - technical To Lender: Simpson Thacher & Bartlett LLP - legal To Authority: Nossaman LLP - legal Jeffrey A. Parker & Associates, Inc. - financial Reynolds, Smith and Hills, Inc. - technical The Corradino Group - construction oversight To USDOT TIFIA JPO: TIFIA Legal Advisor: Hawkins Delafield & Wood LLP TIFIA Financial Advisor: Taylor-DeJongh
Lenders	12-bank club (senior bank debt) USDOT TIFIA
Duration / Status	Construction began in June 2009; substantial completion was achieved on March 26, 2014.
TIFIA Credit Assistance	Direct loan: $603 million USDOT has a subordinate lien on availability payments made by FDOT to I-595 Express, LLC.
Financial Status	TIFIA loan agreement was executed on March 2, 2009. Financial close reached on March 3, 2009 The first interest payment is scheduled for December 2014. Principal

	repayments are scheduled to begin in 2031. The final maturity of the TIFIA loan is June 2042. A six-month debt service reserve based on senior and TIFIA interest and principal will be available until the final maturity of the TIFIA loan. A $9 million contingency reserve will be available until six months after scheduled substantial completion to cover construction cost overruns and help maintain target minimum DSCR.
Innovations	First U.S. application of availability payments to a transportation project. I-595 Express, LLC will receive no compensation from FDOT until the facility is fully operational. Upon FDOT's final acceptance of the project construction, I-595 Express, LLC will be eligible to receive a series of annual lump sum final acceptance payments, including potential incentive bonuses for completing a series of interim milestones (related to major construction activities) within established contractual deadlines. Performance-based availability payments will be made monthly during the operating period of the project. A maximum availability payment of $65.9 million (in 2009 dollars) begins in 2014 and escalates annually. If quality and performance requirements stipulated in the contract as well as availability of the roadways to traffic are not met, then the availability payments will be subject to downward adjustment in accordance with the contract

Source: Federal Highway Administration, U.S. Department of Transportation

3-2 Procurement & Bidding Process

In the case of “Florida I-595 Corridor Roadway Improvements Project” FDOT asked stringent Statement of Qualifications (SOQ) and Project Information Memorandum (PIM) for the candidate teams. In response, 6 teams submitted SOQ on November 5, 2007 describing their track-record, technical strongest, and financial depth. Expert panels judged a double-blind evaluation at the point of independence and transparency. The group of panels, scoring committee scores to each team using adjectival scoring process. On December 3, 2007, FODOT selected 4short-list proposers who submitted SOQs:

< Table8> Procurement Structure of "Florida I-595 Roadway Improvement Project"

ACS Dragados-Macquarie Partnership

Equity Member	ACS Infrastructure Development
Equity Member	MIHI LLC (Macquarie Group)
Lead Contractor	Dragados USA, Inc.
Lead Contractor	Grandi Labori Florida (GLF Construction Corporation)
Lead Contractor	Hubbard Construction Company
Lead Engineering Firm	Earth Tech, Inc.
Lead Operations and Maintenance Firm	Iridium Concesiones de Infraestructuras S.A.

Direct Connect Partners

Equity Member	Skanska Infrastructure Development AB
Equity Member	John Laing plc
Equity Member	Fluor Enterprises, Inc.
Lead Contractor	Skanska USC Civil, Inc.
Lead Contractor	Fluor Enterprises, Inc.
Lead Engineering Firm	HDR Engineering Inc.
Lead Operations and Maintenance Firm	Roy Jorgenson Associates, Inc.

Express Access Team

Equity Member	Babcock & Brown Infrastructure Group US LLC
Equity Member	Bilfinger Berger BOT Inc.
Lead Contractor	PCL Civil Constructors, Inc. (JV)
Lead Contractor	Archer Western Contractors, Ltd. (JV)
Lead Engineering Firm	PB Americas, Inc.
Lead Operations and Maintenance Firm	Transfield Services Limited

I-595 Development Partners

Equity Member	OHL Concesiones, S.A.
Equity Member	Goldman Sachs Global Infrastructure Partners I, LP
Equity Member	Balfour Beatty Capital, Inc.
Lead Contractor (70%)	OHL, S.A.
	Community Asphalt Corp.
	Condotte America, Inc.
Lead Contractor (30%)	Kiewit Southern, Co.
Lead Engineering Firm	Jacobs Engineering Group, Inc.
Lead Operations and Maintenance Firm	OHL Concesiones, S.L.

Source: Federation Department of Transportation

On February 11, 2008, 'Direct Connect Partners' withdrew from biddier-consideration and 2 days prior to bid submission, 'I-595 Development Partners' announced that they would not be submitting a proposal. So remaining two teams participated on bidding process, which were 'ACS Dragados-Macquarie Partnership', and 'Express Access Team'. ACSID were responsible for 100% full-equity investment and Macquarie was in charge of financial advisor. The other team, Express Access Team had 2 equity members, 'Babcock & Brown Infrastructure Fund North America (BBIFNA)' and 'Bilfinger Berger Project Investment Inc.'

< Table9> Final Bidders of "Florida I-595 Roadway Improvement Project

ACS Dragados-Macquarie Partnership

Equity Member	ACS Infrastructure Development
Lead Contractor	Dragados USA, Inc.
Lead Contractor	Grandi Labori Florida (GLF Construction Corporation)
Lead Contractor	Hubbard Construction Company
Lead Engineering Firm	Earth Tech, Inc.
Lead Operations and Maintenance Firm	Iridium Concesiones de Infraestructuras S.A.

Express Access Team

Equity Member	Babcock & Brown Infrastructure Fund North America (BBIFNA)
Equity Member	Bilfinger Berger Project Investments (U.S.A.) Inc.
Lead Contractor	PCL Civil Constructors, Inc. (JV)
Lead Contractor	Archer Western Contractors, Ltd. (JV)
Lead Engineering Firm	PB Americas, Inc.
Lead Operations and Maintenance Firm	VMS Inc.

On October 24, 2008, ACSID was selected as the best proposer. ACSID offer a MAP $63,980,000 while EAT proposed a MAP $144,497,830. EAT achieved a higher score on technical perspectives, but EAT's financial feasibility score was lower than ACSID's. As EAT was insufficient to overcome the cost different comparing with ACSID.

3-3 Contract Issue: DBF vs DBFOM

The Federation Department of Transportation in Florida considered PPPs as a vehicle for both the financial and risk aspects. At first time, Federation Department of Transportation in Florida separated the I-595 improvement projects into several contract packages to be delivered during construction period. But, FDOT determined to make the one single construction-contract packaging to cover all of the I-595 infrastructure separated project and to provide financing mechanism for this project. "This single contract could deliver the road improvement project about 15 years earlier than under traditional pay-as-you-go procurements."(Jeffery A. 2006) Accelerated delivery made it possible cost-efficiencies in terms of less-disruption to traffic jam due to the construction-related lane closure, less-

confusion from ordering raw materials to managing construction, and less-interest cost regarding financial issue. To say details, "the first funding option considered was a Design-Build-Finance (DBF) procurement authorized under Public-Private Partnership legislation approved by the Florida Legislation in 2004. Using DBF procurement could let a single contract to complete the project in 3-5years. The contractor would earn payment as construction's milestones are reached but FDOT would not be paid until the future work program allocations. For raising fund, the contractor or third party should finance the future payment (Jeffery A.2009)."[29] FDOT also considered a. DBFOM contract includes design, construction, financing, operation and maintenance for the project. "Financing includes both debt and equity, which a concessionaire derives revenue from the long-term project assuming higher risks. DBFOM must get profit via ongoing performance over the contract such as annual availability payments, future toll revenue (Jeffery A.2009).[30]" DBF is a receivables structure for design-build process payment once earned, which are not risky for future performance. But, DBFOM offers the opportunity to complete construction to earn a future revenue steam, whereas a DBF is just design-build-finance contract with delayed milestone payments.[31] FDOT realized that DBFOM contract is much more attractive than DBF for potential concessionaires. Also, FODT intended that DBROM enables to achieve lifecycle cost efficiency in terms of long term operation and maintenance by the private sector.

[29] "I-595 Corrider Roadway Improvement Money Analysis" p7 Jeffery A. Parker& Associates, Inc. June 2009

[30] "I-595 Corrider Roadway Improvement Money Analysis" p7 Jeffery A. Parker& Associates, Inc. June 2009

[31] "I-595 Corrider Roadway Improvement Money Analysis" p7 Jeffery A. Parker& Associates, Inc. June 2009

3-4 Risk Management via "Availability Payment Model"

"Availability Payments Model" is used for tolling is infeasible long-term project costs Availability payments also used if the public sector wants to retain demand risk since the potential private partners are reluctant to take risks. "The I-595 697 Express Toll Lanes Project is an availability payment project where the public sector is responsible for collecting toll revenue, but relies on other sources as the basis for its long-term responsibility to pay the concessionaire. Availability payments may be paid from the State transportation trust 700 fund and Florida Turnpike Enterprise. Toll revenues offset the obligations from these sources."(FHWA, 2012)[32] One of the reasons FDOT selected "Availability Payments Model" was to manage toll rates to optimize mobility along roadway. Availability payments contract can be more attractive for potential private investors to avoid form the demand risk or lack of revenue sources. Availability payment enables to be easier to raise capital and allows the equity investors, which the private partner can focus on delivering construction, maintenance and operation of the project.

Also, to ensure stable Availability Payment Model, Florida States limited on obligation to prevent public sector as follows:

Florida's Limitations on P3 Obligations*: "When Florida authorized the use of P3s, it explicitly limited the amount of funding that can be obligated for future payments to 15 percent of its five-year work program. This is one potential mechanism to prevent public agencies from over-committing future resources to P3 projects."*

(*Source*: Florida Highway Administration)

FDOT statuettes 2 provisions on PPPs's Availability Payments as following:

[32] http://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf (p66/679-700)

< Table10 > FDOT's Provisions on PPP's Availability Payments

1	*"The annual payments under such agreement shall be included in the department's tentative work program… and the long-range transportation plan for the applicable metropolitan planning organization… The department shall ensure that annual payments on multiyear public-private partnership agreements are prioritized ahead of new capacity projects in the development and updating of the tentative work program"*
2	*"The annual payments are subject to annual appropriation by the Legislature as provided in the General Appropriations Act in support of the first year of the tentative work program."*

Source: FDOT

The Florida I-595 project allocated risks by PPPs. Risk Matrices, <*Table8*> chart show that who retain the risk and which risk was shared in PPPs. In case of Florida I-595 project, clearly defining the public sector's role and the private sector's responsibility allowed the effective risk management for the project. As risk allocation require multiple cooperation between the public partner and the private partner

<Table11> Florida I-595 Express Lanes Risk Allocation (Risk Matrices)

Risk Category	Risk Allocation		
	FDOT	Concessionaire	Shared
Political	X		
Financial		X	
Traffic & Revenue	X		
Right-of-Way	X		
Permits/Government Approvals			X
Utilities			X
Procurement	X		
Construction		X	
Operations & Maintenance		X	
Hand-Back		X	
Force Majeure			X
Change in Law	X		
Contamination			X
Geotechnical		X	

Source: Florida Department of Transportation

CHAPTER IV

Case Study 2. “Incheon International Airport Expressway” Project In Korea

IV. Case Study 2. “Incheon International Airport Expressway” Project in Korea

4-1. Korean Infrastructure Development’s Brief History

Korea has demonstrated a remarkable record of economic performance since the early 1960s. Most of economic success is related with infrastructure development. In the between the early 1960s and the late 1980s, Korea realized sizable economic benefits from infrastructure investments. Several factors enabled this innovative changes; “Strong leadership and efficient coordination for installing the infrastructure necessary to spur economic performance, a well-defined focus and priorities on infrastructure development, and willingness and flexibility were the critical factors (Reinfeld, 1997).”

At Korea's first 5Year Development Plan (1962-1966), infrastructure development on 275 km of railways and highway projects made it possible to import substitution capacity.
The second Five-Year Development Plan (1967-1971), the period which grew economic growth about 50 percent per year, infrastructure development was accelerated especially on railway, and highway. The third Five-Year Development Plan (1972-1976), Korean government initiated integral parts of economic development, social infrastructure including the 487km of highway project, Seoul subway system, major port project in Busan, and Inchon.

4-2. Recent Korean Issues about Infrastructure Development

Korean infrastructure projects have been challenged by Korean government and private equity investment. Korea is one of the nations around the world subject to famous for its fast modernization and advanced infrastructure. Infrastructure development can be expected to generate substantial economic benefits. Expressways all around Korean

territory have accommodated the growing numbers of cars in the Korea. It also provides people an excellent land transportation services by maintaining KTX trains possible internet-grid and bus facilities. Air transportation also has a remarkable development over the past years. Aside from international airports in Incheon, Pusan and Jeju Island, some domestic airports were opened to serve not only local citizens but also the vast number of tourists visiting the country. It contributes the growth of visitors in Korea. The expansion on ports and harbor is also one of the major projects Korea has focused on in response to its growing economy. The same is true for power-generated facilities and telecommunication services.

<Table12>Visitor Arrivals, International Tourism Receipts & Expenditures in Korea

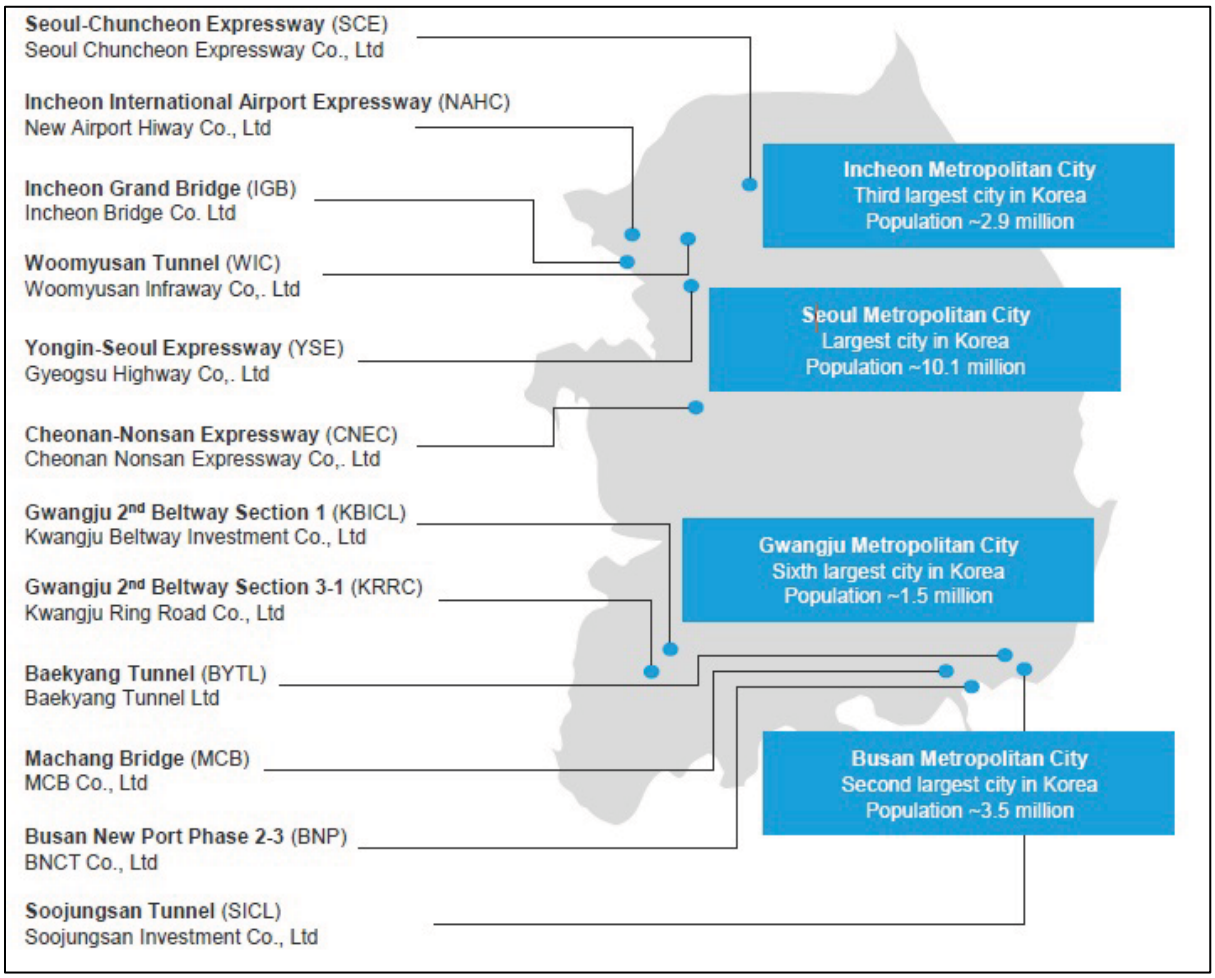
Year	Visitor Arrivals (Number)	Korean Departures (Number)	Tourism Receipts (US$ 1,000)	Tourism Expenditures (US$ 1,000)	Balance (US$ 1,000)
2000	5,321,792(14.2)	5,508,242(26.9)	6,811,300(0.1)	6,174,000(55.3)	637,300
2001	5,147,204(-3.3)	6,084,476(10.5)	6,373,200(-6.4)	6,547,000(6.0)	-173,800
2002	5,347,468(3.9)	7,123,407(17.1)	5,918,800(-7.1)	9,037,900(38.0)	-3,119,100
2003	4,752,762(-11.1)	7,086,133(-0.5)	5,343,400(-9.7)	8,248,100(-8.7)	-2,904,700
2004	5,818,138(22.4)	8,825,585(24.5)	6,053,100(13.3)	9,856,400(19.5)	-3,803,300
2005	6,022,752(3.5)	10,080,143(14.2)	5,793,000(-4.3)	12,025,000(22.0)	-6,232,000
2006	6,155,047(2.2)	11,609,878(15.2)	5,759,800(-0.6)	14,335,900(19.2)	-8,576,100
2007	6,448,240(4.8)	13,324,977(14.8)	6,093,500(5.8)	16,950,000(18.2)	-10,856,500
2008	6,890,841(6.9)	11,996,094(-10.0)	9,719,100(59.5)	14,580,700(-14.0)	-4,861,600
2009	7,817,533(13.4)	9,494,111(-20.9)	9,782,400(0.7)	11,040,400(-24.3)	-1,258,000
2010	8,797,658(12.5)	12,488,364(31.5)	10,321,400(5.5)	14,291,500(29.4)	-3,970,100
2011	9,794,796(11.3)	12,693,733(1.6)	12,396,900(20.1)	15,544,100(8.8)	-3,147,200
2012	11,140,028(13.7)	13,736,976(8.2)	13,448,110(8.5)	16,519,900(6.3)	-3,070,900
2013	12,175,550(9.3)	14,846,485(8.1)	*14,303,000(6.4)	*17,838,200(8.0)	*-3,535,200

*:estimate

Source: Korean Tourism Organization (Growth %)

These improvements and developments wouldn't in any way be possible without the joint efforts of the government and private sectors. For years, Korean infrastructure projects have been carried out through Korean government and private equity investment. Here is the list of recent infrastructure projects all over the country

< Figure 6 > Infrastructure Development PPPs' Cases in Korea



Source: Macquarie IR

PPPs projects have contributed to be balanced development in Korean territory and its growing economy in respect to its transportation system. But, behind the good intentions to improve the Korean infrastructure, some problems later arose from these projects.

4-3 "Incheon International Airport Expressway" Project

The "Incheon International Airport Expressway" project was initiated by government-financed basis under "the Act on Promotion of Private Capital Investment in Social Overhead Capital" in 1994. In1995, the government reformed the financial structure by participating the private sectors to ease raising capitals for the expressway construction.

<Figure7>Incheon International Airport Expressway

The "Incheon International Airport Expressway" project implemented Public-Private Partnerships flows, which the concessionaire was consists of 11 construction companies. The government selected BTO (Build-Transfer-Operate) clause on concession agreement. In 2000, the completed expressway has been refinanced, and current ratio of equity holders are 24.1% of MKIF(Macquarie Korea Infrastructure Fund), and most of other equity-holders are institutional investors.

<Table13> "Incheon International Airport Expressway "Project

	Contents
Project Name	New Airport Hiway Co., Ltd. (NAHC), Concessionaire of Incheon Airport Express
Type of Partnerships	BTO (Build-Transfer-Operate)
Total project cost	1,334 billion KW
Capital structure	Equity 25% Debt59% Construction Subsidy 16%
Length	40.2 kilometers, 8 lanes
Construction period	November 1995–November 2000
Operational period	30 Years
Minimum Revenue Guarantee	80%, 20 years
Revenue Cap* (*Partial revenue sharing in excess of 80% to 110% level	110% of annual CA projected revenue
Current phase	In Operation
Current Equity Consortium (2014)	*MKIF 24.1% , Subordinated Loan 51.7billion KRW *(MKIF: Macquarie Korea Infrastructure Fund)
Tolls	7,600 KW (small vehicle)
Competent authority	Ministry of Land, Transport and Maritime Affairs

Source: KDI(Korean Development Institution), Macquarie Infrastructure Fund

4-4 Financial Approach to Private Consortium

< Table 13> shows that how the private consortium raised financial sources to invest PPPs' projects. In case of NAHC(Incheon International Airport Expressway), the project's capital is consist of 58.2% Equity(including 24.1% equity of MKIF) and 51.7% Subordinated Debt, which means equity holders and subordinated debt owners are institutional investors such as IB(Investment banking), commercial bank, pension or, and insurance companies. MKIF should pay highly interest-cost since subordinated debt usually requires highly interest rate for the debt-owners located lower ranking of debt-ownership repayment. Why MKIF chose the debt instead of equity? Raising high interest costs means 4 possibilities for debt issuer, MKIF as follows:

<Table14>The Private Partners Consortium: Equity/Debt

Unit: Billion (KW)

Name	Abbrev.	Equity	Ownership (%)	Subordinated Debt	Interest Rate (%)	Senior Debt	Interest Rate (%)	Total
Baekyang Tunnel	BYTL	1.2	100.0	-		1.4	15.0	2.6
Gwangju Second Beltway, Section 1	KBICL	33.1	100.0	35.2[2]	20.0	142.0	10.0	210.3
Incheon International Airport Expressway	NAHC	58.2	24.1	51.7	13.9	-		109.9
Soojungsan Tunnel	SICL	47.1	100.0	19.3	20.0	30.6	8.5	97.0
Cheonan-Nonsan Expressway	CNEC	87.8	60.0	182.2	20.0	-		270.0
Woomyunsan Tunnel	WIC	10.7	36.0	9.6	20.0	-		20.3
Gwangju Second Beltway, Section 3-1	KRRC	28.9	75.0	-		49.1	7.85	78.0
Machang Bridge	MCB	33.8	70.0	79.0	11.4	-		112.8
Yongin-Seoul Expressway	YSE	57.8	35.0	77.0	15.0	-		134.8
Seoul-Chuncheon Expressway	SCE	48.6	15.0	87.4	11.6	-		136.0
Incheon Grand Bridge	IGB	74.5	41.0	89.4	9.3	-		163.9
Busan New Port Phase 2-3	BNP	66.4	30.0	243.0[3]	12.0	-		309.4
Total		**548.1**		**873.8**		**223.1**		**1,645.0**
Percentage(%)		**33.3%**		**53.1%**		**13.6%**		**100%**

Source: MKIF(Macquarie Korea Infrastructure Fund)

[1] Tax-deduction: If the project earns high-yield from revenue sources, the private partner should pay income-tax to the government. By issuing debt, in this case high-cost subordinated debt; it enables tax-deduction via raising cost on balance sheet, while issuing stocks can't offer tax-effects.

[2] MKIF reluctant to dilute existing shareholders by issuing equity. As MKIF has 24.1% of equity ownership, they want to protect their shelter.

[3] "In the Bottom of the Bag" : Infrastructure development require substantial funding. To raise capital, firm usually increase the ratio of equity issuing stocks or progress IPO(initial public offering) but possibly MKIF were under the difficulty to raise capital for the large-size scale of infrastructure investment with long-term.

[4] In downsizing market, high interest income such as subordinated debt or bond will be more attractive than low-value equity shares for investors.

4-5 Demand Risk & Financial Risk

The possible volume of PPPs' leveraging and most of financial future cash flows can be derived from forecasting demand using infrastructure facilities. PPPs benefits that the public sector effectively transfers demand risks to the private sectors, which are related with financial risk. Infrastructure projects usually require debt-financing mortgaged from future revenue sources such as tolls and taxes. The private sector can achieve financial leverage on infrastructure investment with willingness than the public sector. As "*the private partner may be achieve greater financial leverage on a project by being more willing to accept projections of higher revenues or lower cost or financing projects at lower coverage levels*

than the public sector(FHWA, 2012)."

The public sector would be less aggressive to take financial risks than the private investors since private investors can get leverage effect from debt financing project while the financial risk affect to public sector's operation and maintenance. And these financial risks derived directly from the demand risks, which some of Korean infrastructure projects resulted in default. If demand for using facilities like; expressway, roadway, bridge and subway; are less than expected, the private investors lose their investment (sometimes extend to commercial bank's bankrupt) and infrastructure project will not be materialized.

"In recent years, potential project investors have been more reluctant to accept a high degree of demand risk. Many P3 agreements in the United States now include revenue sharing agreements and a mix of public and private financing. Some P3 agreements use availability payments, where the public sector pays the private sector an agreed upon annual or monthly fee for meeting performance standards set in the agreement (FHWA, 2012)."

Despite of this private sector's strength in funding, Korean Infrastructure projects in PPPs' flows have been under default (in fact) from the surplus estimation of facility demand.

"A current issue regarding the failure of Macquarie infra-fund project enhanced major infrastructure investment, gave negative perspectives to Korean and Korean government. There is one more issue, if the private partner will progress the project such as operation, maintenance, the charging fees will be increased. Reflecting this public sentiment, SOC projects have barriers if project can't guarantee the stable profits for certain for the private investors." (On interview with Hyun W. Woori Bank IB)

< Table15> Average Daily Traffic Volume of PPPs' Projects

	3Q 2014				2014 (YTD)			
	Average daily traffic volume		Average daily traffic revenue		Average daily traffic volume		Average daily traffic revenue	
	Vehicles/day	% change on YTD	KRW thousand/day	% change on YTD	Vehicles/day	% change on pcp	KRW thousand/day	% change on pcp
Incheon International Airport Expressway	65,165	10.0%	394,370	7.8%	60,030	9.8%	366,843	4.8%
Baekyang Tunnel	74,399	2.3%	53,362	2.4%	72,930	1.4%	52,312	1.5%
Gwangju Second Beltway, Section 1	43,183	4.6%	45,323	5.1%	41,626	4.6%	43,884	5.1%
Gwangju Second Beltway, Section 3-1	34,451	2.1%	36,341	2.2%	33,637	1.7%	35,504	1.7%
Woomyunsan Tunnel	27,331	6.7%	59,034	6.7%	26,607	5.9%	57,461	5.9%
Cheonan-Nonsan Expressway	49,311	5.0%	410,483	5.6%	46,722	4.9%	389,815	5.4%
Soojungsan Tunnel	46,482	6.6%	33,904	6.7%	45,086	4.6%	32,909	4.7%
Machang Bridge	27,262	65.5%	60,593	67.1%	25,099	58.8%	55,854	60.6%
Yongin-Seoul Expressway	76,983	8.0%	138,061	8.1%	74,272	7.4%	133,165	7.4%
Seoul-Chuncheon Expressway	47,662	3.2%	300,444	3.3%	41,273	3.0%	261,623	3.3%
Incheon Grand Bridge	38,008	13.6%	194,608	13.0%	34,742	12.9%	179,222	12.2%

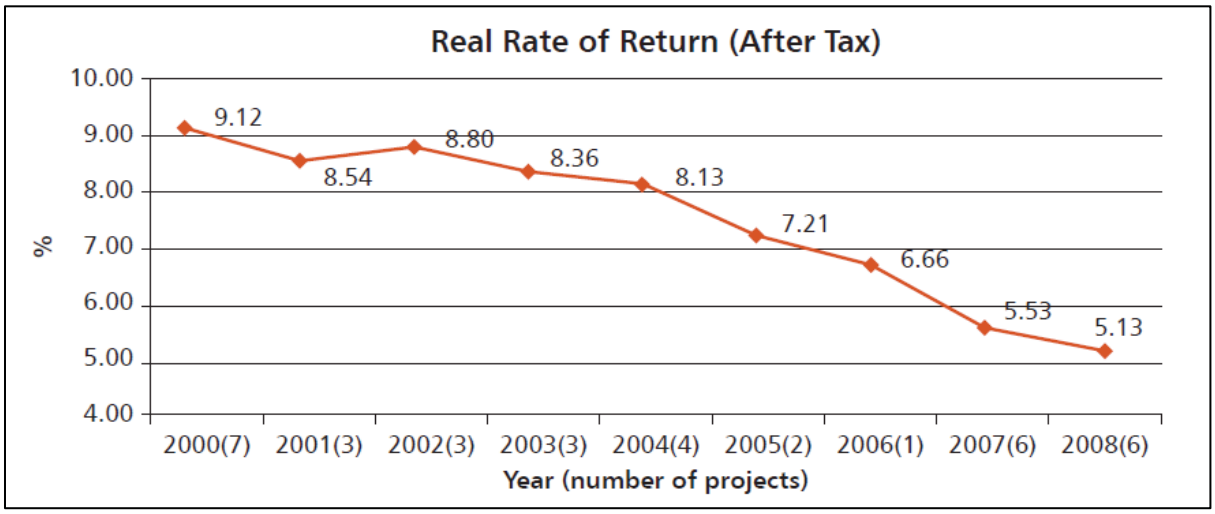
Source: Macquarie Infrastructure Fund

This chart describe that the average daily traffic volume in Public-Private Partnerships'' projects recently. In 2014, Average daily traffic volume of Incheon International Airport Expressway, was 60,030 - 65,155 vehicles/day. With this demand number, it is possible to estimate the future revenue. But, there is the fundamental problem Korean government faces, which is the PPP's project s size of volume are extraordinary bigger than the actual needs. So it will be require finding out the other method, plan B to fulfill the revenue recourse at the point of the government's perspective. The failure to gauge the actual size of demand for toll gates and expressways brought loss to the private investors, (but in case of 'Macquarie Infrastructure fund', the private partner came up with an limited agreement, Minimum Revenue guarantee (MRG) from Korean government.) The actual losses of the projects are at the shouldered by Korean taxpayers.

4-6 Minimum Revenue Guarantee Agreement

[1] The Background of Korean MRG (Minimum Revenue Guarantee)

<*Figure 8*> Rate of Return for Signed BTO Road Construction Projects (%)



Source: KDI

Since the Public Private Partnerships Act in 1998, ROR(Rate of Return)[33]of project diminished gradually from 9.12% (2000yr) to 5.13%(2008yr) according to the KDI data. To promote the construction and to support the operation for the private partners, the Korean government offered subsidies to the private partners called "Minimum Revenue Guarantee" during construction and operation-period. MRG is an attractive clause for the private partners, which enables to transfer high-risk and burden of uncertainty from the infrastructure development to the government. "The government guaranteed private investors a certain minimum percentages of expected revenue of a project. If revenues are under the guaranteed level, the government filled up the gap. Vice versa the government had the right to redeem revenue above a certain revenue level based on project revenue (ADB, 2011)[34].

But, the MRG program for unsolicited projects was ended in 2006 since the Korean government should take burden of fiscal risks from the uncertainty; also had a difficulty

[33] Rate of return for BTO projects is defined by the internal rate of return (IRR), which is the discount rate that makes the present value of cash inflow equal to outflow (net present value = 0). Rate of return of the project is determined through negotiations between the concessionaire and the government or by competition among project proponents.(KDI,2001) p42-43

[34] ADB (2011) "Public Private Partnership Infrastructure Project; Case Studies vl.1 p.43

estimating benefits and costs.

<Table16> Total Amount of MRG Subsidies for Project in Operation by Year **(billion KW)**

	2001	2002	2003	2004	2005	2006	2007	2008 (Estimated)	Total
Number of projects	2	2	3	6	5	7	8	8	–
Amount	65.3	73.7	142.0	157.8	123.3	186.2	285.7	376.2	1,390.3

Source: The Ministry of Strategy and Finance, Republic of Korea

As this chart, the amounts of MRG/year have been increased remarkably in Korea since 2006. Though the MRG subsidies ended for unsolicited project, the government was on still requiring the subsidies from the private company due to the valid MRG agreement until the system ended. (The actual size of demand for the early projects was about 50% of expected demand.) After completing the projects' construction, more projects would move to the next phase, the operational step, which step has potential possibility to increase more MRG.[35]

[2] MRG Agreement with Macquarie Infrastructure Fund

At the "Minimum Revenue Guarantee Agreements" between Korean government and private partners Macquarie Infrastructure Fund have set a legal obligation with Korean government to recover the case of that the private operator generated losses from the certain level. Here is the MRG Agreement list of Macquarie Infrastructure Fund.

< Table 17> 2014 MRG Agreement List of 'Macquarie Infrastructure Fund' in Korea

[35] Revised ADB (2011) "Public Private Partnership Infrastructure Project; Case Studies from the Republic of Korea vl.1 p.43

Asset	Relevant Authority	Concession Term	Concession Term Remaining	Revenue Guarantee Duration	Revenue Guarantee Duration Remaining	Revenue Guarantee Threshold[1]	Revenue Cap Threshold[1,2]
Baekyang Tunnel	Busan Metropolitan City	25	10	25	10	90%	110%
Gwangju 2nd Beltway, Section 1	Gwangju Metropolitan City	28	14	28	14	85%	115%
Incheon International Airport Expressway	MOLIT[3]	30	16	20	6	80%	110%
Soojungsan Tunnel[4]	Busan Metropolitan City	25	13	25	13	90%	110%
Cheonan-Nonsan Expressway	MOLIT	30	18	20	8	82%	110%
Woomyunsan Tunnel	Seoul Metropolitan City	30	19	30	19	79%[5]	110%
Gwangju 2nd Beltway, Section 3-1	Gwangju Metropolitan City	30	20	30	20	90%	110%
Machang Bridge	GSND[6]	30	24	30	24	75.78%	120%
Yongin-Seoul Expressway[7]	MOLIT[3]	30	25	10	5	70%	130%
Seoul-Chuncheon Expressway[7]	MOLIT[3]	30	25	15	10	80%/70%/60%	120%/130%/140%
Incheon Grand Bridge	MOLIT[3]	30	25	15	10	80%	120%
Busan New Port Phase 2-3	MOF[8]	29	26	N/A	N/A		
Weighted average[9]		**29**	**21**	**17**	**9**		

1. % of annual concession agreement projected revenue
2. Relevant government authorities are entitled to receive the portion exceeding the threshold
3. MOLIT (Ministry of Land, Infrastructure and Transport)
4. In toll revenue below 90%, Busan City Government is obliged to compensate 91.5% of the shortfall amount
5. 79% up to 2023 and 78% from 2024 to 2034
6. GSND (Gyeongsang Namdo (Provincial) government)
7. No revenue guarantee applies if actual revenue are below 50 % of the toll revenue forecast
8. MOF (Ministry of Oceans and Fisheries)
9. Weighted by investment commitment

Source: Macquarie Infrastructure Fund

The chart shows that ratio of MRG offered to MKIF (Macquarie Korea Infrastructure Fund) depending on the projects. In case of "Incheon International Expressway" project, MKIF cossesionarie agreed on 80% of minimum guarantees for 20 years from the government, while the government was entitled to receive the revenue above a 110% of the threshold of project revenue. MRG Agreement will be valid on these 12 projects until the next 17years on average. Considering at the point of 'the failure of forecasting-demand', MRG Agreement has been financial burden to the Korean government. Korean government has filled the loss-gap between the actual revenue and minimum-revenue threshold. The government has taken almost all of risks paying high and strongly-stable revenue, MRG to the private partner.

< Table 18> Actual Subsidy Paid in 8 Infrastructure Projects (%, Billion KW)

Table 3-3 Minimum Revenue Guarantee Agreement—Actual Subsidy Paid in 8 National Projects (%, W billion)

Classification		2001	2002	2003	2004	2005	2006	2007	2008 Estimated
Incheon International Airport Expressway: 80% guaranteed over 20 years (operated since 21 November 2000)	Actual/projected traffic volume	47%	45%	41%	39%	53%	52%	52%	49%
	MRG subsidy	59.1	68.4	95.3	100.9	66.1	71.0	80.8	93.4
Cheonan–Nonsan Expressway: 82% guaranteed over 20 years (operated since 23 December 2002)	Actual/projected traffic volume	–	–	47%	52%	55%	54%	58%	55%
	MRG subsidy	–		40.4	38.6	39.0	40.4	39.0	43.0
Dague–Busan Expressway: 90% guaranteed over 20 years (operated since 11 February 2006)	Actual/projected traffic volume	–	–	–	–	–	56%	61%	55%
	MRG subsidy	–	–	–	–	–	33.7	33.1	420
Outer Beltway 1 (Ilsan–Toegyewon): 90% guaranteed over 20 years (operated since 30 June 2006)	Actual/projected traffic volume	–	–	–	–	–	159%	185%	-
	MRG subsidy	–	–	–	–	–	(4.8)	(16.7)	-
Gwangju 2nd Beltway, Section 1: 85% guaranteed over 28 years (operated since 29 November 2000)	Actual/projected traffic volume	56%	65%	63%	61%	59%	53%	43%	40%
	MRG subsidy	6.2	5.3	6.3	7.0	8.6	10.0	11.7	15.0
Woomyunsan Tunnel: 85% guaranteed over 30 years (operated since 31 December 2003)	Actual/projected traffic volume	–	–	–	40%	45%	49%	51%	45%
	MRG subsidy	–	–	–	10.5	9.6	8.6	7.6	10.0
New Mokpo Outport 1-1: 90% guaranteed over 20 years (operated since 29 May 2004)	Actual/projected traffic volume	–	–	–	62%	99%	65%	65%	33%
	MRG subsidy	–	–	–	0.75	0	2.5	2.9	4.4
New Mokpo Outport 1-2: 80% guaranteed over 20 years (operated since 30 May 2004)	Actual/projected traffic volume	–	–	–	75%	74%	80%	56%	44%
	MRG subsidy	–	–	–	0.02	0.14	0	0.9	1.8

Source: Ministry of Strategy and Finance, Korea

Table 3-3 The chart shows the projected traffic volume and actual MRG subsidies paid to the private partners in Korean infrastructure projects. The chart shows that the actual ratio of MRG offered to the private partners during 2001-2007. For example, in case of "Incheon International Expressway" project, the actual traffic volumes have not reached 80% of minimum threshold during 2001-2007 remarkably. Defaulted project has been forced to compensate losses to Korean government from 59.1 to 80.8 billion won depending on the minimum revenue guarantee. According to the recent report, Hankyoreh New(2013),

" *Incheon Airport Expressway, 406.6 billion(US$406.6million) won were paid by taxpayers to make up the losses, and the project "which holds 100% of the shares in section one of the Gwangju No. 2 beltway lost an administrative suit recently. As a result, it had to alter the capital structure to recover the original low-interest debt at the beginning of the project*

(Hankyoreh News, Mar.26.2013)[36]. The MRG Agreement has been financial burden to Korean government and periodically MRG has put pressure the government's budget until now.

According to the ADB report (20011), *"The government has tried to mitigate the financial burden from its MRG commitments. One of most direct efforts is to consult with the project company and develop plans to increase revenue. Other efforts include preparing refinancing guidelines. When the project company refinances, the principle of a 50:50 share of refinancing gains between the project company and the government is required in the annual PPP Basic Plan. In practice, the actual gain for the government varies depending upon the methods used for measuring the gain (ADB, 2011)[37]."*

[3] MRG's Problems : FISCAL RISK & MORAL HAZARD

At the point of 'uncertainty', it is hard to estimate future demand. How can we recognize MRG level is low or high on the agreement. There are some problems to be expected from the MRG Agreement.

1) Fiscal Risk

MRG Agreement is positive for promoting and encouraging the private partners to participate the national infrastructure projects at the point of transferring financial risk to the government. But the government takes most of the project risks from construction period to operation period. If the national budget paid extremely to subsidies for long-term, the government can't avoid from the fiscal risk.

2) Moral Hazard Problem: MRG caused "Full-Stomached Grasshoppers"

[36] Hankyoreh News, http://www.hani.co.kr/arti/english_edition/e_international/579790.html

[37] ADB (2011) "Public Private Partnership Infrastructure Project; Case Studies from the Republic of Korea vl.1 p.43

MRG Agreement pursues the social security to ensure and to promote the national infrastructure investment. But, MRG Agreement has possibility to discourage efforts to maximize revenue to the private partners called moral hazard. For example, in the port projects, the private port operators will not need to work to increase port traffic as minimum revenue guarantee system paid regularly to fill the loss from the government. So, the private operators have possibility to abuse the MRG Agreement to get subsidies not becoming ‘a diligent ant’ but pursuing ‘a full-stomached grasshopper’.

CHAPTER V

Interview Regarding Korean Infrastructure Project

V. Interview Regarding Korean Infrastructure Project, Applying the Questionnaires, "Key Features on PPP-enabling by States"

Here is the list of the questionnaires applying on < *Figure 3. Key Features on PPP-enabling legislation by state* > from question no.1-7. And the questionnaires (No.1-7) applied to < *Figure 3. Key Features on PPP-enabling legislation by state* > and my research questionnaires (No.8-10) were asked to 3 interviewees who have experienced in Korean infrastructure development in private sector.

Interviewee 1: Joong Woo Kim, Deputy General Manager in Hana Daetoo Securities (in charge of SOC Investment Division)
Interviewee 2: Susan Kim, Project Manager Gail International (in charge of Incheon International Airport project)
Interviewee 3: Hyun-Wook Park, Woori-Bank Investment Banking Division

The Answers are as follows:

< ***Table 19. Interviews Regarding Korean Infrastructure Development Environment*** >

	Questions	Y/N	The Details of Korean Legislation	On Interviews
1	Solicited &unsolicited proposals allowed	Yes	**Article 6** (Solicited Projects to be Deliberated by Committee) The term "Solicited Projects of the specified scale as determined by the Presidential Decree or larger" in Article 8-2 (2) of the Act means Infrastructure Projects which require a total project cost. (The total project cost is calculated by Article 22 (1). The same shall apply here in forth.) of 200 billion KRW or more. <Amended by Presidential Decree No. 17928, Feb. 24, 2003, Mar. 8, 2005> **Article 7**	*Interviewee 1:* Yes *Interviewee 2*: Yes *Interviewee 3*: Yes

			(Implementation Process for Unsolicited Projects Proposed by Private Sector) (1) A project proposal containing each of the following items shall be submitted to the Competent Authority when a party in the Private Sector intends to propose a project promoted by means of the private investment method in accordance with Article 9 (1) of the Act. <Amended by Presidential Decree No. 17093, Dec. 30, 2000, Mar. 8, 2005> *Source*: ENFORCEMENT DECREE OF THE ACT ON PRIVATE PARTICIPATION IN INFRASTRUCTURE (p53-54)	
2	Local, state, or federal funds can be combined with private sectors fund	Yes	**Article 27** (Operation Standard of Management Institution) The Credit Guarantee Fund (hereinafter referred to as the "Management Institution") under Article 30 (2) of the Act shall establish a standard for its work process to promote efficiency in the management of the Fund, and submit it to the Minister of Planning and Budget. <Amended by Presidential Decree No. 16326, May 24, 1999 **Article 28**(Management of Fund) The term "other purposes as determined by the Presidential Decree" in subparagraph 5 of Article 32 of the Act means one of the following purposes: 1.Deposit in financial institutions; 2.Purchase of bonds under subparagraphs 1 through 3 of Article 2 (1) of the Securities and Exchange Act, or bonds guaranteed by the State or any financial institutions; 3. Underwriting or purchase of stocks(including investment certificates), debentures, or other securities as deemed by the Minister of Planning and Budget to be necessary; and 4. Other purposes which the Minister of Planning and Budget deems necessary for the	*Interviewee 1:* Yes *Interviewee 2*: Yes *Interviewee 3*: Yes

			implementation of PPI Projects. *Source*: ENFORCEMENT DECREE OF THE ACT ON PRIVATE PARTICIPATION IN INFRASTRUCTURE (p67)	
3	Various kinds of procurements are allowed for project delivery	Yes		*Interviewee 1:* Yes *Interviewee 2*: Yes *Interviewee 3*: Yes
4	Long-term lease/franchises granted by the public sector for construction, operation, and maintenance of toll facilities			Interviewee 1: Yes (*"It is different depends on the projects. long-term lease is possible"*) Interviewee 2: Yes Interviewee 3: Yes (*"Possible. but would be reluctant to invest long-term lease project*)
5	Public sector has authority to lease toll revenue bonds or notes			*Interviewee 1:* Yes(*"Different depends on the projects*.") *Interviewee 2*: Yes *Interviewee 3*: Yes
6	Public sector agency can hire its own technical and legal consultants			*Interviewee 1:* Yes *Interviewee 2*: Yes *Interviewee 3*: Yes
7	Public sector outsources long-term operations and maintenance and other asset management duties to the private sector	Yes	**Article 24** (Registration of Management and Operation Rights) The Decree on Registration of Port Facilities Management Right shall apply mutatis mutandis with regard to the registration under the provisions of Articles 26 (2) and 28 (1) of the Act. <Amended, Mar. 8, 2005> **Article 25**(Management and Maintenance of Facilities) The Competent Authority may establish and apply standards for the management and maintenance of the facilities under subparagraphs 1 through 3 of Article 4 of the Act during the free use period or ownership and profitable use period.	*Interviewee 1:* Yes *Interviewee 2*: Yes *Interviewee 3*: Yes

			<Amended, Mar. 8, 2005> (2) The Concessionaire of the facilities under paragraph (1) above shall notify a management and maintenance plan to the Competent Authority in accordance with the terms as determined by the Concession Agreement. *Source*: ENFORCEMENT DECREE OF THE ACT ON PRIVATE PARTICIPATION IN INFRASTRUCTURE (p66)	
8	What is the optimal mixture of PPP to maximize the public purpose?(eq uity, leading -role portion)		<u>*Interviewee 1*</u>: *"The mixtures are flexible based on the project's characteristics.* <u>*Interviewee 2*</u>: *"This is such a hard question to answer since it depends on the market and type of transaction. And it varies greatly due to market and type of transaction. You must tap the market at the time of the transaction. For the Gale Project, there was no mixture of equity. Just pure funding and finding was easy given the guarantee of the transaction. Full guarantee by POSCO."*	
9	What was the most difficult factor to implement the PPP project?(poli cy, law, procurement, funding etc.)		<u>*Interviewee 1*</u>: *"On-time, On-budget is key criteria to make successful projects. But, frequent policy changes make hard to deliver the projects as usually infrastructure projects require long-term perspectives. So we should take authorities carry-out agreement risks. Negative perspectives about PPP's project including price policy and default issues like the recent 'Macquarie infra-fund case made barrier to implement make proposals and deliver projects.*" <u>*Interviewee 2:*</u> *"Depending on the project it varies. Projects where law is not clear, it will be need law. Funding is really never difficult element if the project is good."*	
10	If you have any advices for PPPs for infrastructure development in Korea, please leave message.		<u>*Interviewee 1*</u>: N/A <u>*Interviewee 2*</u>: N/A <u>*Interviewee 3:*</u> *"A current issue regarding the failure of Macquarie infra-fund project enhanced major infrastructure investment, gave negative perspectives to Korean and Korean government. There is one more issue, if the private partner will progress the project such as operation, maintenance, the charging fees will be increased. Reflecting this public sentiment, SOC projects have barriers if project can't guarantee the stable profits for certain for the private investors."*	

Source: "The Details of Korean Legislation" based on " ENFORCEMENT DECREE OF THE ACT ON PRIVATE PARTICIPATION IN INFRASTRUCTURE" [38]

[38] http://pimac.kdi.re.kr/law/law2_33.pdf

CHAPTER VI

Conclusion/ Suggestion

Limitation

V. Conclusion/ Suggestion

Conclusion

Infrastructure development has been expected to generate substantial economic benefits and added-value on potential economic growth both in the developing countries and the developed countries. In Korea the remark size of volume of infrastructure investment since 2000s on expressway, tunnels, high-speed KTX trains (230km/h) and internet-grid have contributed to Korean development in many ways. Those projects have been delivered with Public-Private Partnerships. At the aspect of transferring risks to the private sectors including financial risks PPPs enables infrastructure investment broadly and aggressively than conventional infrastructure development projects.

Infrastructure development requires delicate analysis at the point of structuring partnership, forecasting demand, contract agreement, legislation, and financial analysis. As infrastructure development takes a long period from designing, building, financing, operating to maintaining, the projects are facing many risks. Especially, financial risks can be derived from the revenue sources that linked to the demand forecasting. At this point “Availability Payment Model” will be relatively stable method to implement infrastructure projects at the point of transferring demand-risk.

And to make possible effective PPPs’ projects there are several options should be accompanied.

[1] Small-scale infrastructure development project

[2] Stable payment

PPPs projects should be permitted the small-size scale of projects and non-complicated projects. Infrastructure project usually require higher transaction costs. As the higher transaction costs also reflect to the private partner’s price like a higher toll fee. Profit-seeking

private partners usually want to compensate their investment from toll fees or use-fees of infrastructure facilities. Expected higher transaction cost make higher price, which this is not fulfill the public purpose, cheaper charge-oriented public service. Also charging infra-facilities is sensitive issue related with national inflation. The other way, if the public sector controls the limited maximum public charge, the private sector will be default or try to suggest the higher use-fees periodically to reimburse their higher transaction cost or maintain their minimum profit from projects. This means large-scale size of infrastructure projects and complicated projects-cases are unsuitable to apply public-private partnerships. Therefore, PPPs are permitted on small-scale projects or, typically expected stable revenue projects to enable private partner solve the funding gap. This problem is actually what Korean government recently faces related with MRG(Minimum Revenue Guarantee) issue. Originally MRG system intended to encourage potential private partners to participate the national infrastructure projects, which have been financial burden to the Korean government causing fiscal risk.

Suggestion

1. Furthermore, Korean government should have financial stability, financial independence other words, “financial health” by itself for infrastructure investment. To realize the financial independence, the government should be considered the setup of government infrastructure fund such as pension fund and national bond to make the optimal mixture PPPs. At the point of public sector’s perspective, transferring all of risks to the private sectors is ideal but, only PPPs method limited to be effective and to be successful infrastructure development.

2. To retain the stable revenue resources, various types of revenue resources should be innovated in marketing aspect. “Package ticket” can be one example. If the PPP’s roadway

is the way going to amusement park, Everland, , mixture of tolls, parking fees, entrance fee, 1 cup of drink can make more extra profit share to PPPs' project. To give one more example, it created more revenue such as "Package ticket for Incheon Airport Expressway", mixture of tolls, parking fees, 1 bottle of water, and a discounted commission exchange. Likewise, the government needs to apply innovation to make new type of revenue resources systemically.

3. MRG(Minimum Revenue Guarantee) Agreement should be permitted for specific period to promote construction or to support emergency like disaster. MRG system pursues to encourage potential private partners to participate the national infrastructure projects. But now the Korean government faces extreme financial burden from MRG Agreement. Also, the government needs to study the various contract clauses and provision at the point of securing fiscal stability to apply the national infrastructure projects and it will contribute to maximize the value between the public sector and the private sector.

4. Systemically the government should dedicate on infrastructure-investment PPP's scenario manuals at the point of design, construction, maintenance and operation periodically on a case by case. Infrastructure investment and development project require long life-cycle. The lesson recently we experienced from miss-forecasting demand on Macquarie Infrastructure Fund Projects should be re-studied and dig over not to repeat the same mistakes.

Limitation

1. This research was ultimately to figure out the answer about the optimal mixture of Public - Private Partnerships. To design the optimal mixture of PPPs' infrastructure should be assume the micro-, macro-economic stability.

2. I tried to have interviews with whom in charge of Macquarie Infrastructure Fund. But, it was limited to access the sources and experience during the project period.

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< Appendix 1> Type of PPP in the United States (January 2005-May 2008)

PPPs for New Build Highway and Transit Facilities in the United States (January 2005 – May 2008)			
Project	**Location**	**Status**	**Type of PPP**
TTC-35	Texas	Concession Awarded	Concessionaire responsible for preparation of master development plan and for some or all of the development, design, construction, financing, operation and/or maintenance of an approximately 600-mile corridor from Mexico to Oklahoma
SH-130 Segments 5&6	Texas	Closed	Concession to design, build, finance, operate and maintain approximately $1.3 billion facility as first segment of TTC-35 project
I-69/TTC	Texas	Preferred Bidder Selected	Concessionaire responsible for preparation of master development plan and for some or all of the development, design, construction, financing, operation and/or maintenance of an approximately 650-mile corridor from Mexico to Texarkana/Shreveport
I-635	Texas	RFP Issued	Concession to design, build, finance, operate and maintain tolled managed lanes in Dallas/Fort Worth area
North Tarrant Express	Texas	Bidders Shortlisted	Concession to design, build, finance, operate and maintain tolled managed lanes and general lanes in North Tarrant County
DFW Connector	Texas	Bidders Shortlisted	Concession to develop, design, construct (and at TxDOT's sole option maintain) tolled managed lanes on the SH-114/SH-121 corridor in Dallas/Fort Worth area
Capital Beltway HOT Lanes	Virginia	Closed	Concession to design, build, finance, operate and maintain HOT lanes on a 14-mile stretch of I-495 in northern Virginia
I-95/I-395 HOT Lanes	Virginia	Interim Agreement Executed	Concession to design, build, finance, operate and maintain HOT lanes on a 56-mile stretch of I-95/I-395 in northern Virginia
US Route 460	Virginia	Bidders Shortlisted	Concession to design, build, finance, operate and maintain $1 billion to $2 billion improvements to Route 460 in southeastern Virginia
Midtown Corridor Tunnel	Virginia	Solicitation Issued	Concession to modify the existing tunnel linking Portsmouth and Norfolk, construct a new parallel tunnel and extend freeway
Port of Miami Tunnel Project	Florida	Preferred Bidder Selected	Concession to design, build, finance, operate and maintain a tunnel providing access from the Port of Miami to the Florida mainland
I-595 Improvements	Florida	Bidders Shortlisted	Concession to design, build, finance, operate and maintain improvements on the I-595 corridor between I-75 and I-95
First Coast	Florida	RFQ Issued	Concession to design, build, finance, operate

PPPs for New Build Highway and Transit Facilities in the United States (January 2005 – May 2008)			
Project	**Location**	**Status**	**Type of PPP**
Outer Beltway			and maintain a limited access toll facility outside of Jacksonville
Northwest Corridor	Georgia	Development Agreement Executed	Concession to develop, design and construct express toll lanes, BRT lanes and possibly TOT lanes on I-75 and I-575 northwest of Atlanta
I-285 Northwest TOT Lanes	Georgia	Evaluation of Proposers	Concession to design, build, finance, operate and maintain TOT lanes on I-285 and I-20 northwest and west of Atlanta
GA-400 Crossroads Region	Georgia	Evaluation of Proposal	Concession to design, construct, operate and maintain HOT lanes on GA-400 north of Atlanta
I-20 Managed Lanes	Georgia	Pre-Solicitation	Concession to design, build, finance, operate and maintain two managed lanes on the I-20 corridor east of Atlanta
Missouri Safe & Sound Bridge Program	Missouri	Preferred Bidder Selected	Concession to upgrade, finance, operate and maintain more than 800 bridges in Missouri
Knik Arm Crossing Project	Alaska	Bidders Shortlisted	Concession to design, build, finance, operate and maintain a bridge connecting Anchorage with Mat-Su borough
The Airport Parkway	Mississippi	RFQ Issued	Concession to develop, build, finance, operate and maintain a parkway from downtown Jackson to the airport
Oakland Airport Connector	California	RFP Issued	Concession to design, build, finance, operate and maintain the Oakland Airport Connector
Denver RTD	Colorado	RFQ Expected	Concession to design, build, finance, operate and maintain the East, Gold Line and Commuter Line Maintenance Facility in the Denver area
Metro Solutions Phase II	Texas	Bidders Shortlisted	Facility Provider will be responsible for design and construction of civil works; furnishing and installation of equipment; initial operations and maintenance; and financing services for Light Rail projects in Houston
I-73	South Carolina	Request for Conceptual Proposals	Concession to design, build, finance, operate and maintain the 80-mile portion of I-73 connecting Myrtle Beach with the North Carolina border
Mid-Currituck Bridge	North Carolina	Bidders Shortlisted	Concession for new 7-mile bridge over Currituck Sound connecting mainland and the Currituck County outer Banks south of Corolla

Source: Federal Highway Administration, U.S. Department of Transportation

< Appendix 2> Comparison of Quantitative Assumption

COMPARISON OF DBF AND CONCESSION

	AUGUST 2007			MARCH 2009	
		Concession			Concession
	DBF	Availability Payments	Shadow Tolls	DBF	Availability Payments
Construction					
Construction period (years)	5	5	5	5	5
Construction costs (millions of 2007$)	$1,250	$1,250	$1,250	$1,111	$1,111
Design costs	10%	10%	10%	$86	$86
CEI	12%	5%	5%	12%	5%
Risk contingency	10%	5%	5%	5%	-
Construction cost overrun	5%	-	-	5%	-
Operations					
Operating period (years)	30	30	30	30	30
Annual O&M expense (millions of 2007$)	$8.7	$8.7	$8.7	Concessionaire's annual schedule assumed	
Capital renewal & replacement costs (millions of 2007$)	$43.0	$43.0	$43.0	for both DBF & Concession	
Capital renewal & replacement cycle (years)	15	15	15	N/A	N/A
Operating period expense contingency	10%	10%	10%	N/A	N/A
Operations risk contingency	-	5%	5%	N/A	N/A
Operating period expense overrun	20%	-	-	N/A	N/A
O&M contract renewal overrun (after year 15)	10%	-	-	N/A	N/A
Federal corporate income tax rate	-	35.00%	35.00%	-	35.00%
State corporate income tax rate	-	5.50%	5.50%	-	5.50%
Financing					
Financing of FDOT progress payments/FAPs:	Bonds	PABs	PABs	Loan	Loan
All-in interest rate	4.28%	4.28%	4.28%	6.25%	6.58%[2]
Debt establishment fee	0.60%	0.60%	0.60%	3.00%	3.00%
Term (years)	12	12	12	9.5	9.5
State-issued bonds for refinancing / long-term debt:	Bonds	PABs	PABs	Loan	Loan
Base interest rate	4.60%	3.82%	3.82%	N/A	3.84%
Credit margin	1.00%	1.10%	1.10%	N/A	3.00%[2]
Wrap fees	N/A	0.26%	0.41%	N/A	-
Swap spread	-	-	-	N/A	0.30%
All-in interest rate	5.60%	5.17%	5.32%	N/A	7.14%
Term (years)[1]	23	34	34	N/A	23
TIFIA interest rate (including 0.01% credit margin)	N/A	N/A	N/A	3.64%	3.64%
Initial debt-to-equity ratio	N/A	92%	90%	100%	87.5%
Equity IRR	-	10.00%	10.75%	N/A	11.5%
Procurement					
Adjustment for procurement costs	-	-	-	($2.0)	-

[1] For DBF, 23-year bonds assumed in 2007 replace 12-yr construction debt for total debt term of 35 yrs. Concession long-term financing is concurrent with financing of progress payments/FAPs.
[2] Includes 3.00% credit margin during construction that steps up to 3.25% in years 6 and 7, 3.50% in year 8 and 9, and 4.00% in year 10.

Source: Florida Department of Transportation, U.S.

< Appendix 3> GLOSSARY OF TERMS

Public-Private Partnership: a contractual agreement formed between public and private sector partners, which allows more private sector participation than is traditional. The agreements usually involve a government agency contracting with a private company to renovate, construct, operate, maintain, and/or manage a facility or system. While the public sector usually retains ownership in the facility or system, the private party will be given additional decision rights in determining how the project or task will be completed. The term public-private partnership defines an expansive set of relationships from relatively simple contracts (e.g., A+B contracting), to development agreements that can be very complicated and technical.
http://www.gao.gov/special/pubs/Gg99071.pdf

Shadow Tolling: Shadow tolls are per vehicle amounts paid to a facility operator by a third party such as a sponsoring governmental entity. Shadow tolls are not paid by facility users. Shadow toll amounts paid to a facility operator vary by contract and are typically based upon the type of vehicle and distance traveled.

Tolling: the process of collecting revenue whereby road users are charged a fee per roadway use. Tolls may be collected on a flat-fee basis, time basis, or distance basis and may vary by type of vehicle

<Appendix 4> Types of Partnerships Including 'Lease' component

Developer Finance
The private party finances the construction or expansion of a public facility in exchange for the right to build residential housing, commercial stores, and/or industrial facilities at the site. The private developer contributes capital and may operate the facility under the oversight of the government. The developer gains the right to use the facility and may receive future income from user fees. While developers may in rare cases build a facility, more typically they are charged a fee or required to purchase capacity in an existing facility. This payment is used to expand or upgrade the facility. Developer financing arrangements are often called capacity credits, impact fees, or extractions. Developer financing may be voluntary or involuntary depending on the specific local circumstances

EUL: Enhanced Use Leasing or Underutilized Asset
An EUL is an asset management program in the Department of Veterans Affairs (VA) that can include a variety of different leasing arrangements (e.g. lease/develop/operate, build/develop/operate). EULs enable the VA to long-term lease VA-controlled property to the private sector or other public entities for non-VA uses in return for receiving fair consideration (monetary or in-kind) that enhances VA's mission or programs.

LDO or BDO: Lease-Develop-Operate or Build-Develop-Operate
Under these partnerships arrangements, the private party leases or buys an existing facility from a public agency; invests its own capital to renovate, modernize, and/or expand the facility; and then operates it under a contract with the public agency. A number of different types of municipal transit facilities have been leased and developed under LDO and BDO arrangements.

Lease/Purchase
A lease/purchase is an installment-purchase contract. Under this model, the private sector finances and builds a new facility, which it then leases to a public agency. The public agency makes scheduled lease payments to the private party. The public agency accrues equity in the facility with each payment. At the end of the lease term, the public agency owns the facility or purchases it at the cost of any remaining unpaid balance in the lease. Under this arrangement, the facility may be operated by either the public agency or the private developer during the term of the lease. Lease/purchase arrangements have been used by the General Services Administration for building federal office buildings and by a number of states to build prisons and other correctional facilities.

Sale/Leaseback
This is a financial arrangement in which the owner of a facility sells it to another entity, and subsequently leases it back from the new owner. Both public and private entities may enter into sale/leaseback arrangements for a variety of reasons. An innovative application of the sale/leaseback technique is the sale of a public facility to a public or private holding company for the purposes of limiting governmental liability under certain statues. Under this arrangement, the government that sold the facility leases it back and continues to operate it.

Tax-Exempt Lease

A public partner finances capital assets or facilities by borrowing funds from a private investor or financial institution. The private partner generally acquires title to the asset, but then transfers it to the public partner either at the beginning or end of the lease term. The portion of the lease payment used to pay interest on the capital investment is tax exempt under state and federal laws. Tax-exempt leases have been used to finance a wide variety of capital assets, ranging from computers to telecommunication systems and municipal vehicle fleets.

Turnkey
A public agency contracts with a private investor/vendor to design and build a complete facility in accordance with specified performance standards and criteria agreed to between the agency and the vendor. The private developer commits to build the facility for a fixed price and absorbs the construction risk of meeting that price commitment. Generally, in a turnkey transaction, the private partners use fast-track construction techniques (such as design-build) and are not bound by traditional public sector procurement regulations. This combination often enables the private partner to complete the facility in significantly less time and for less cost than could be accomplished under traditional construction techniques.

In a turnkey transaction, financing and ownership of the facility can rest with either the public or private partner. For example, the public agency might provide the financing, with the attendant costs and risks. Alternatively, the private party might provide the financing capital, generally in exchange for a long-term contract to operate the facility.

Source: The National Council for Public Private Partnership,
http://www.ncppp.org/ppp-basics/types-of-partnerships

< Appendix5> Interview Questionnaires

Interviews regarding "Infrastructure development via Public Private Partnerships"

Name_____

Position_____Company you belonged_____

Project Name_____Year_____

	Questions	Please share your experience or related issues.
1	Solicited and unsolicited proposals allowed in Korea (Yes / No)	
2	Local, state, or federal funds can be combined with private sectors fund (Yes / No)	
3	Various kinds of procurements are allowed for project delivery. (Yes / No)	
4	Long-term lease/franchises granted by the public sector for construction, operation, and maintenance of toll facilities. (Yes / No)	
5	Public sector has authority to lease toll revenue bonds or notes. (Yes / No)	
6	Public sector agency can hire its own technical and legal consultants. (Yes / No)	
7	Public sector outsources long-term operations and maintenance and other asset management duties to the private sector. (Yes / No)	
8	What is the optimal mixture of PPP to maximize the public purpose? (equity, leading role portion)	
9	What was the most difficult factor to implement the PPP project?(policy, law, procurement, funding etc.)	
10	If you have any comments or advices for PPPs for infrastructures development in Korea, please leave message.	